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DECODING T-SCHOOL READINESS

How India's top engineering colleges rank up in the DQ-CMR Employability Index 2021

TOP 10 T-SCHOOL

INSTITUTE NAME	CITY	RANKING
Indian Institute of Technology, Kanpur	Kanpur	1
Indraprastha Institute of Information Technology, Delhi	New Delhi	2
International Institute of Information Technology, Hyderabad	Hyderabad	3
ABV Indian Institute of Information Technology & Management, Gwalior	Gwalior	4
Netaji Subhas University of Technology	New Delhi	5
Bharati Vidyapeeth College of Engineering	Pune	6
Amity School of Engineering & Technology, Raipur	Raipur	7*
Amity School of Engineering & Technology, Lucknow	Lucknow	7*
Maulana Abul Kalam Azad University of Technology	Haringhata	8
BS Abdur Rahman Crescent Institute of Science & Technology	Chennai	9
Chitkara University Institute of Engineering & Technology	Rajpura	10

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54% Digital Engineering Revenues

*As of June 30, 2021

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69 Fortune 500 Clients

Shubhendu Parth

Gaming business is booming:
What about its social costs?

The pandemic and the lockdown had a major impact on the adoption of everything digital. While the corporate world and the government may rejoice the favourable outcomes – automation of processes, faster and safer delivery of services, rollout of telemedicine, extension of healthcare facilities and more – there was also a surge in online gaming, particularly among young Indians.

According to the KPMG report, 'A year Off Script: Time for Resilience', the lockdown led to a spurt in installs of gaming apps in India. It also indicates that the average time spent on mobile phones increased from ~2.5 hours pre-COVID-19 to ~4.1 hours during the lockdown. Another report by EY and All India Gaming Federation (AIGF) points out that the sector in India jumped 17.3% to touch USD1.027 billion in 2020, up from USD543 million in 2016.

The report, 'Online gaming in India – The GST conundrum', forecasts that the number of Indian online gamers could grow by 41%, from 360 million in 2020 to 510 million in 2022. There are over 400 gaming start-ups whose revenue potential and the value at stake are evident from the EY-AIGF recommendation that GST of maximum 18% should be levied on the sector, at par with other online platforms and software products.

This seems like a valid suggestion from the industry perspective, which is aiming to cash in on the growing craze of gaming in India. According to a World Economic Forum report, 60% of the nation's gamers are under 25 years; mobile users form an overwhelming 85% of the industry, followed by PC users at 11% and tablet users at 4%. While there is no accurate research on the exact number of minors addicted to online and mobile gaming, I assume it would be alarming, given the access to gadgets among school-goers to facilitate online education. This surely should be treated as a matter of concern in view of its long-term social and economic impact.

There is a lesson from China, which recently barred under-18 online gamers from playing on weekdays and curtailed their playtime to three hours on weekends. This is the most stringent curb after 2019 that limited under-18 gaming in China to just 1.5 hours a day. The new rule underscores the intent to control addiction of gaming among youths and push its future workforce toward more productive pursuits.

Can we expect some action on similar lines in India too, or will the government cave in to the lure of revenue growth from the sector?

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Sugandha Srivastava
maildqindia@cybermedia.co.in

From classroom to boardroom: Decoding T-School readiness

The survey on employability of
T-School graduates in India show
emerging trends brought about by
the pandemic and how the education
sector needs to adapt to them

Almost every industry appreciates the new normal culture of working from home. In fact, many sectors are considering making a partial or permanent shift to this culture. As a result of this trend, industries will be able to access resources from around the world. Hence, given the current situation, it is critical for Indian engineering institutes to prepare for the future.

A new study by DQ and CMR around employability shows how different educational institutes performed when it came to securing placement for their students amid the raging pandemic. This was measured by Employability Index, which means possessing a set of qualifications, skills, understandings and personal attributes that make students likely to gain employment and be successful in their chosen occupations.

THE T-SCHOOL EMPLOYABILITY INDEX SURVEY 2021

Unemployment refers to those individuals who are employable and actively looking for work but unable to find one. Those who are working but are not in the right job are also included in this category. On the other hand, we frequently hear companies complain that there are "no competent" candidates or that the available potential employees lack the necessary skills.

So why is there a chasm? It occurs when a worker's skill set does not match the skills required in the available jobs. According to our study, 30% of the employers say that skills shortage is the primary reason for vacancies in organisations and a huge percentage of graduates fall short of industry standards. Because of the gap between existing and desired skill sets, the present employability rate is low.

Many firms ascribe the lack of employability to problems in our educational system because they spend the first three months of their new employees' training on skills essential to accomplish business objectives. Employability is about a broader range of talents and traits that will allow

HR OUTLOOK ON CURRENT JOB MARKET

Feedback of HR managers

- Very good
- Good
- Neutral
- Not good
- Not at all good

2% 2%
15%
34%
47%

36% HR managers think current job market isn't good.

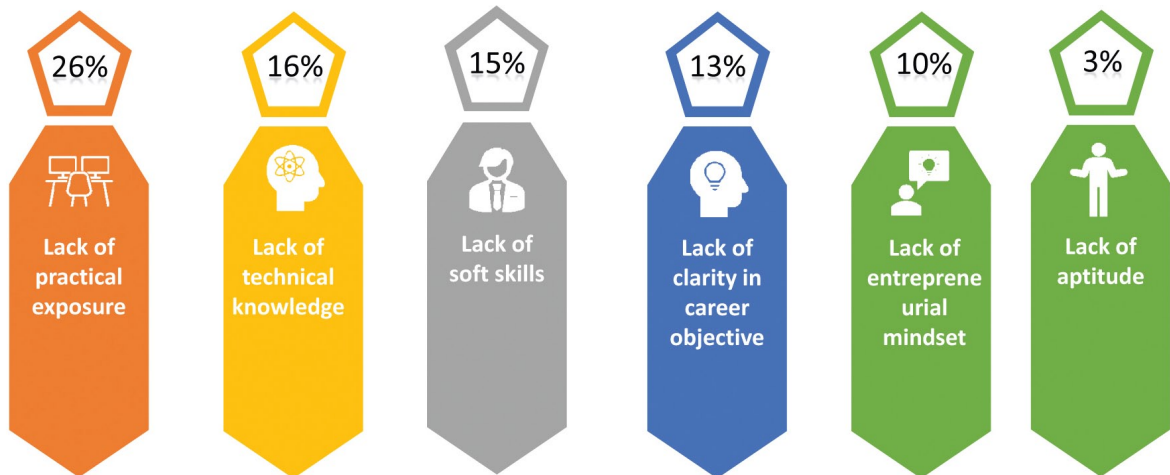47% HR managers are neutral about current job market.

"

30% OF EMPLOYERS BELIEVE THAT SKILLS SHORTAGE IS THE MAIN REASON FOR VACANCIES. THE GAP BETWEEN THE EXISTING AND DESIRED SKILL SETS HAS LED TO LOW EMPLOYABILITY RATE.

you to be successful throughout your working life, and not just landing a job. Employability is defined as the ability of being suitable for paid work. So, we have tried to look into the broader picture on which are the top institutions that can provide new grads a suitable runway to take off their career.

GAPS IN THE QUALITY OF ENGINEERING STUDENTS

Feedback of HR managers

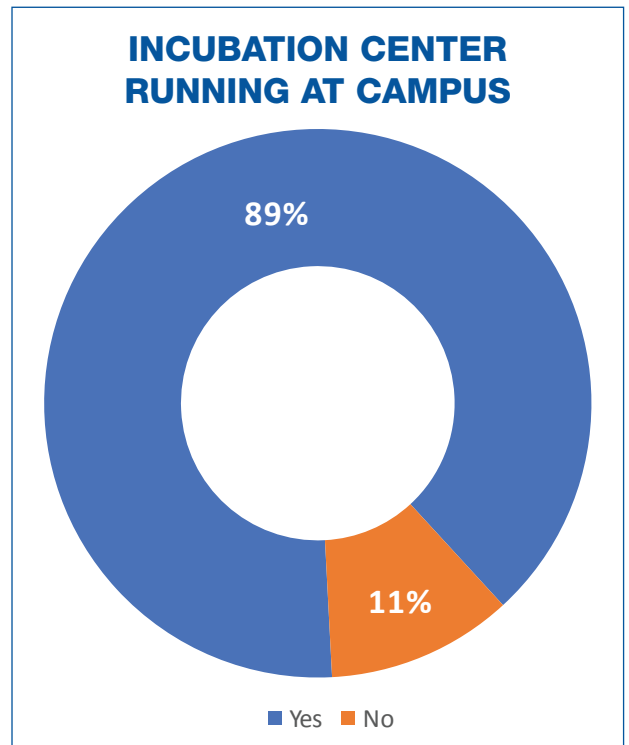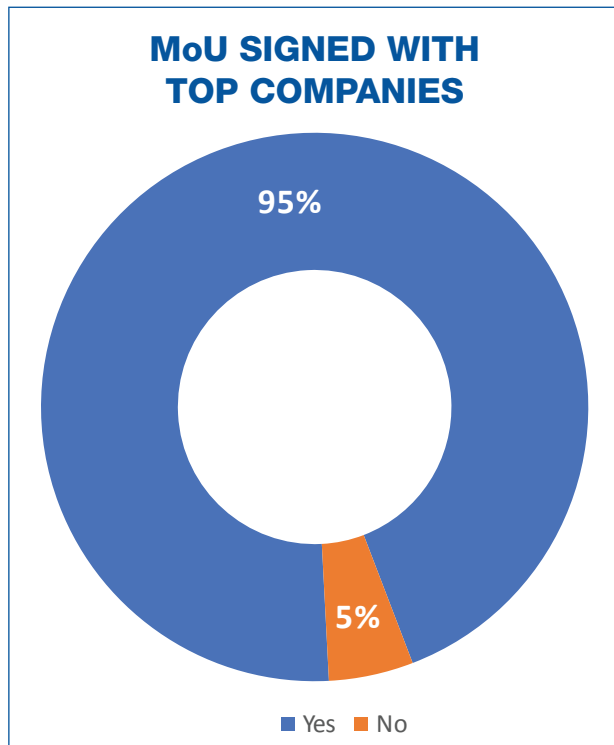| 26%	16%	15%	13%	10%	3%
Lack of practical exposure	Lack of technical knowledge	Lack of soft skills	Lack of clarity in career objective	Lack of entrepreneurial mindset	Lack of aptitude

INTRODUCTION TO REAL WORLD OF INDUSTRY

T-Schools can attune themselves to industry needs through industry involvement, by improving current teaching approaches and, most importantly, providing students with basic training and exposure. Industry participation adds a layer of realism to classroom learning, allowing students to confidently choose their career paths.

MoU SIGNED WITH TOP COMPANIES

Private T-Schools are more proactive, and they outnumber public T-Schools in terms of Memorandum of Understanding (MoU). According to the DQ-CMR T-School Employability Index Survey 2021, 95% of the T-Schools have an MoU signed with an industry partner.

In addition, 89% of the T-Schools polled had established an incubation centre to help entrepreneurs. The incubators, by acting as a link between T-Schools and industry, are able to provide students and faculty members with business feedback from commercial partners who are in charge of scaling up and selling the ideas.

MoU SIGNED WITH TOP COMPANIES

95%

5%

■ Yes ■ No

INCUBATION CENTER RUNNING AT CAMPUS

89%

11%

■ Yes ■ No

"

T-SCHOOLS CAN ALIGN WITH INDUSTRY NEEDS THROUGH INDUSTRY INVOLVEMENT, BY IMPROVING TEACHING APPROACHES AND PROVIDING STUDENTS WITH BASIC TRAINING AND EXPOSURE.

As the COVID-19 situation has made it challenging for graduates to find work, students and parents are even more driven by the ability to get a job rather than the reputation of a university.

While self-learning can be difficult for students to adopt, some institutions have gone to great lengths to provide students with intelligent and easy-to-understand study materials. Institutes have created an online platform where instructors can upload video lectures for students to view and learn at their own pace. Institutions have also administered periodic tests/exams through video calls to ensure progressive learning.

CURRENT YEAR'S HIRING PLAN THROUGH CAMPUS RECRUITMENT

Feedback of HR managers
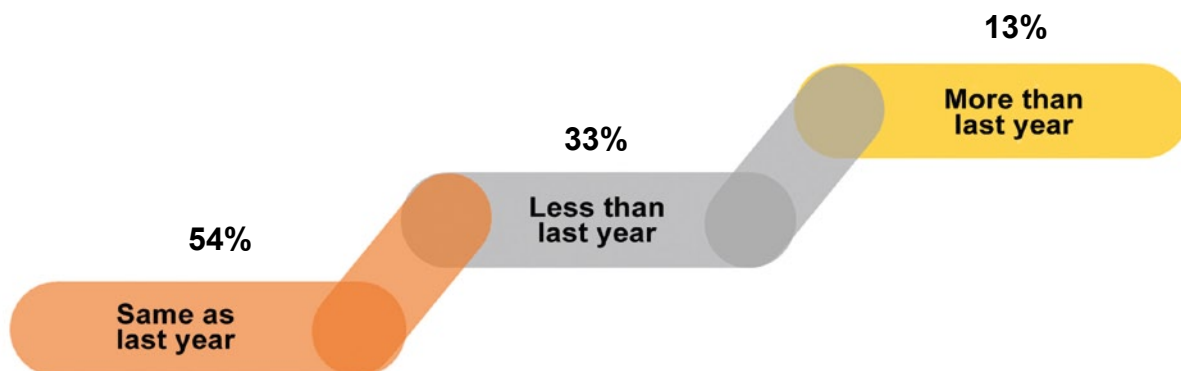
13%
More than last year

33%
Less than last year

54%
Same as last year

"

IN THE POST-PANDEMIC PHASE, ON AN AVERAGE, 542 STUDENTS PER T-SCHOOL OPTED FOR CAMPUS PLACEMENTS IN 2020 WHILE 90 COMPANIES VISITED T-SCHOOLS FOR RECRUITMENT.

The post-COVID-19 period emphasises on creativity and innovation abilities, and is fundamentally a learning environment that welcomes diverse ideas. Engineering education is on the cusp of a dramatic transformation in order to better prepare students for the world of tomorrow.
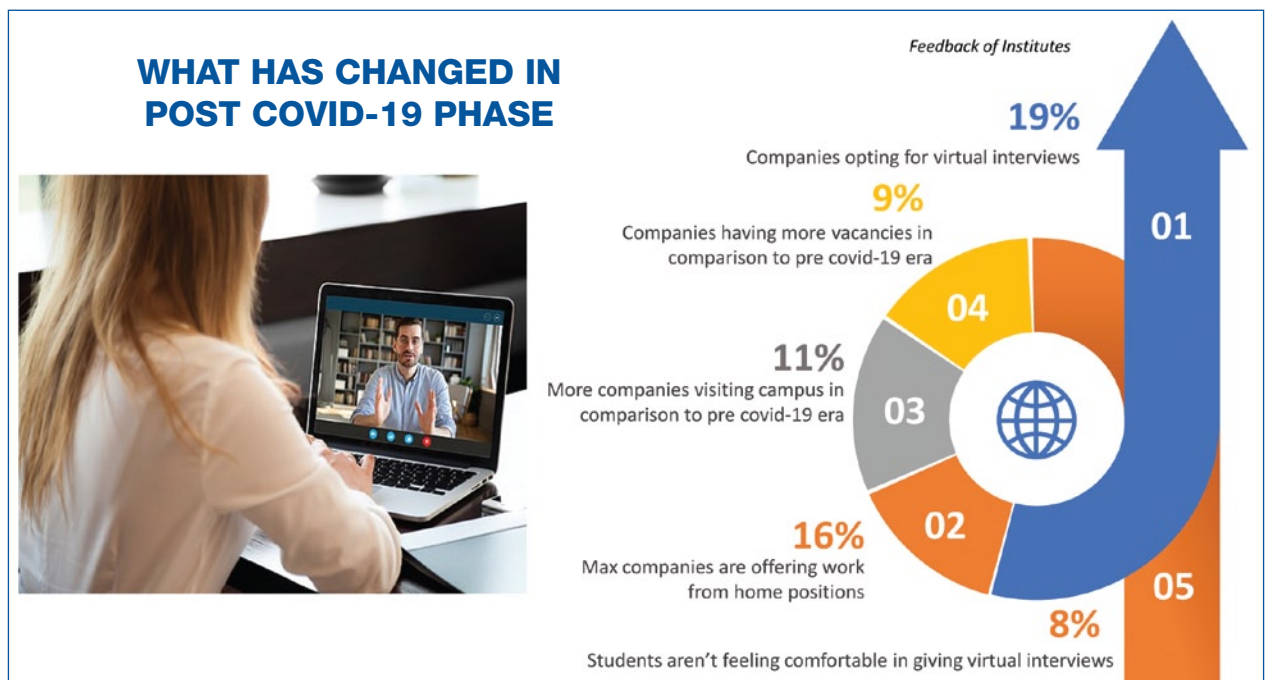
WHAT HAS CHANGED IN POST COVID-19 PHASE

Feedback of Institutes

19%
Companies opting for virtual interviews
01

9%
Companies having more vacancies in comparison to pre covid-19 era
04

11%
More companies visiting campus in comparison to pre covid-19 era
03

02

05

16%
Max companies are offering work from home positions

8%
Students aren't feeling comfortable in giving virtual interviews
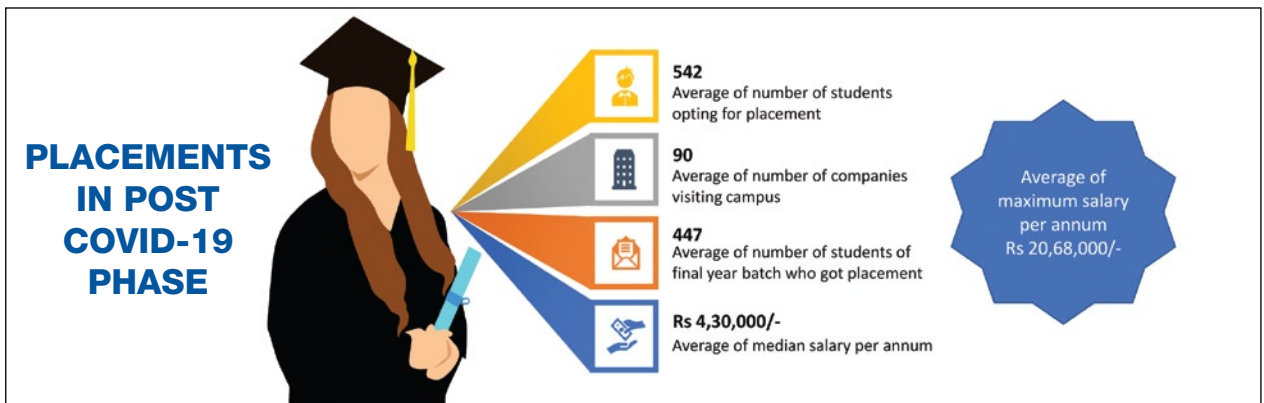
KEY FINDINGS

#1

THE TECH JOB MARKET

An average of 542 students per T-School opted for campus placements in the year 2020, while an average of 90 companies visited T-Schools for recruitment. On an average, 447 students secured jobs via campus placements, while the average salary package in 2020 remained at Rs 4.30 lakh per annum. The average of maximum salaries offered stood at Rs 20.68 lakh per annum.

PLACEMENTS IN POST COVID-19 PHASE

542
Average of number of students opting for placement

90
Average of number of companies visiting campus

447
Average of number of students of final year batch who got placement

Rs 4,30,000/-
Average of median salary per annum

Average of maximum salary per annum Rs 20,68,000/-

#2

KEY SKILLS TO GET A JOB

HR looks at grade points followed by communication skills while selecting candidates. Numerical aptitude is the skill which is the least preferred criterion for selection by the HR as nowadays numerical computations are readily performed by software. Entrepreneurial mindset is another critical skill sought by HR managers.

IMPORTANT PARAMETERS FOR SELECTING ENGINEERING GRADUATES

Feedback of HR managers

87% Grade points in engineering

71% Overall academic background

47% Work experience

Communication skills 77%

Entrepreneurial mindset 59%

Numerical aptitude 39%

"

HR MANAGERS ARE FACING VARIOUS CHALLENGES IN THE ONGOING PANDEMIC. THE TOPMOST IS ENSURING THE AVAILABILITY OF SKILLSETS AS PER THE ORGANISATION'S REQUIREMENT.

#3

SOURCE FOR FINDING THE RIGHT CANDIDATE

Colleges are the most preferred source to find a suitable candidate followed by HR consultancy firms. Internal job posting is another vital source for hiring a suitable candidate from within the existing employee base. From the survey, it has been found that a company relies mostly on its own job portal rather than external job portals, with a huge variation in recruitment between these two sources. While references are always mentioned in the recruitment forms, they are the least preferred source for employment and absorption in the company.

SOURCES FOR FINDING A SUITABLE CANDIDATE

Feedback of HR managers

HR consultancy firms
82%

Company's own job portal 67%

Colleges
75%

Job portals
21%

Internal job posting
74%

References
5%

#4

CULTURAL FIT OVER TECHNICAL KNOWHOW

Cultural fit of candidates is the main consideration of HR managers, and soft skills are the most sought-after skills for them. A candidate with basic skills/competencies but with strong interpersonal skills, behavioural skills and a positive attitude is preferred over a highly technical-skilled individual but with poor interpersonal and intrapersonal skills.

Feedback of HR managers

MOST IMPORTANT CONSIDERATIONS WHILE ACQUIRING NEW TALENT

93%	84%	75%	23%
Attitude, behaviour and cultural fit	Potential for future high performance	Past performance	Skills and competency
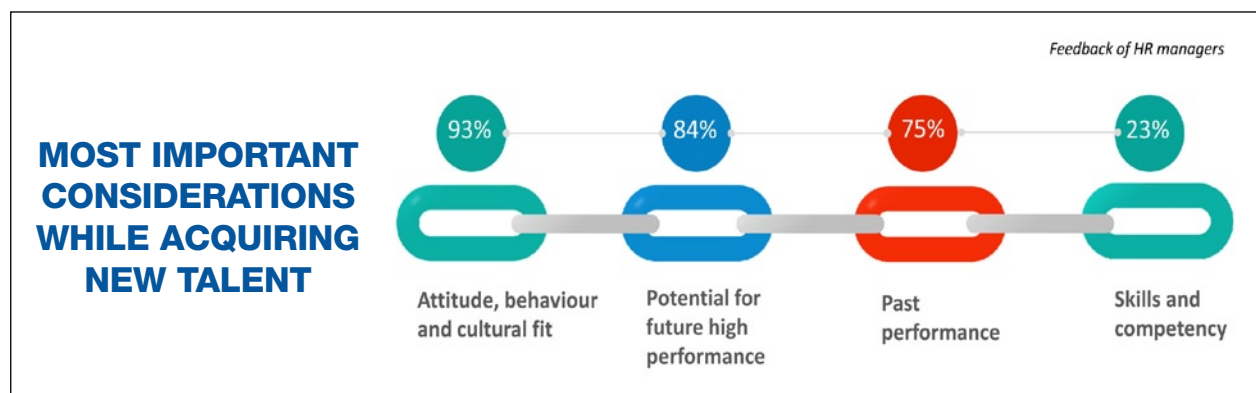
#5

CHALLENGES FOR HR IN THE PANDEMIC

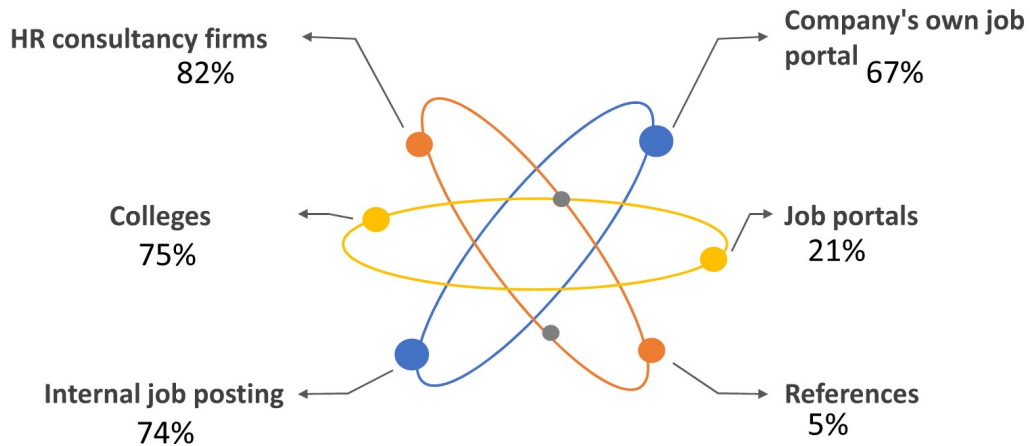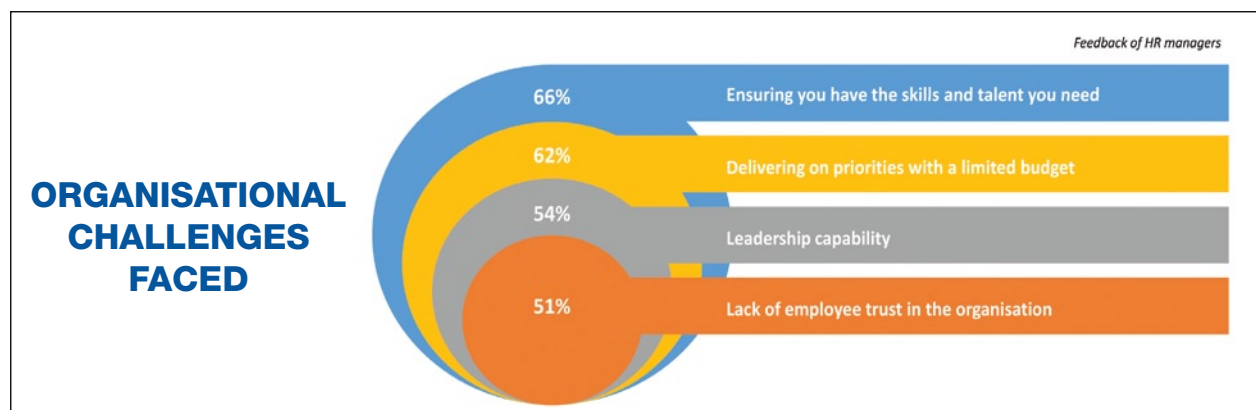HR managers are facing various challenges in the ongoing pandemic. The topmost is ensuring the availability of skillsets as per the organisation's requirement. The next challenge is providing optimum output with limited budget, which also features as one of the major areas of concern.

Feedback of HR managers

ORGANISATIONAL CHALLENGES FACED

66%	Ensuring you have the skills and talent you need
62%	Delivering on priorities with a limited budget
54%	Leadership capability
51%	Lack of employee trust in the organisation

#6

HOW TO ENSURE EMPLOYEE WELL-BEING

To ensure employee well-being, the priority focus area for HR managers is improving the leadership style of graduates who join as employees. Next to it is providing more and more opportunities for the development of these new employees. Ensuring their work-life balance is another area of focus.

FOCUS TO IMPROVE EMPLOYEE WELL-BEING

Feedback of HR managers

85% Leadership style
82% Opportunities for development
66% Work-life balance
51% Organisation Culture
15% Change management
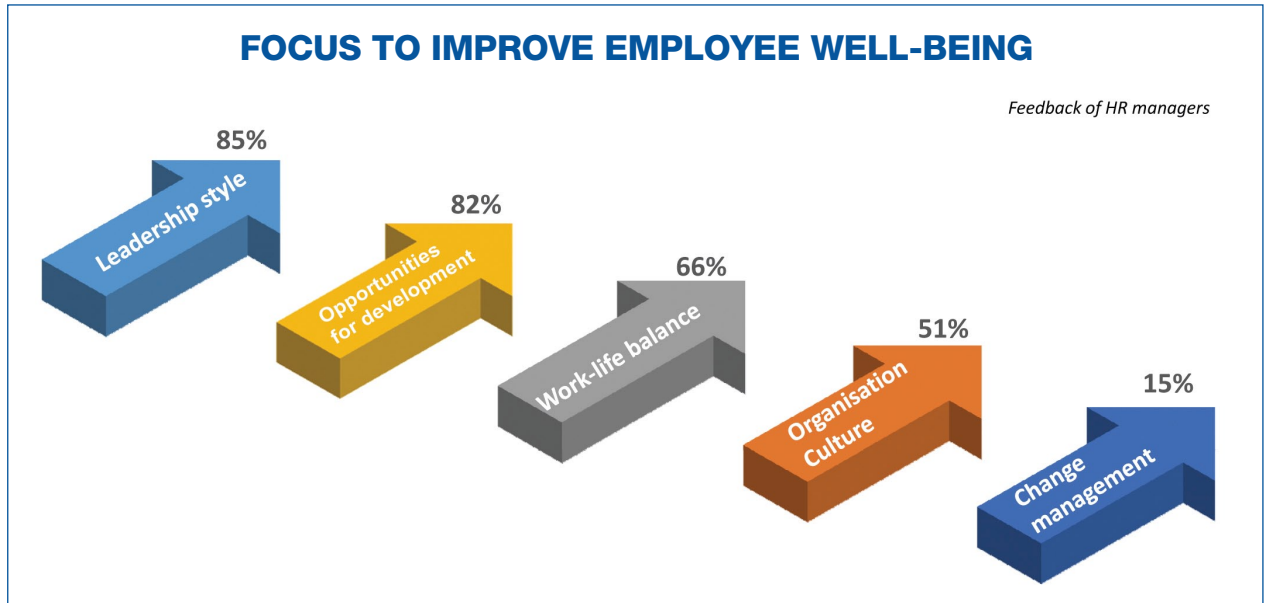
THE WAY FORWARD

Due to the pandemic, T-Schools had a difficult year in 2020. Some institutes were able to rapidly handle the challenges with the help of technology, while others took longer to adjust to the new normal. One of the main issues faced by the educational system is that the teachers' approach is to just teach courses theoretically, according to a prescribed curriculum. It is critical to recognise that an educator's job extends beyond subject teaching; generating employable students is just as important an academic goal as gaining domain knowledge. Consider this: how many teachers are familiar with the industry? Every teacher can get associated with relevant industries to gain a meaningful grasp of their requirements.

This practice has the potential to improve teachers' perspectives on their teaching methods, since they will be able to focus more on the skills that companies seek at the time of placement.

Sugandha is Manager (Research) – Industry Consulting Group, CMR

The research methodology

The DQ-CMR T-School Employability Index Survey 2021 was conducted in two phases – initial desk research and groundwork in Phase 1 and primary research in Phase 2.

PHASE 1: DESK RESEARCH AND GROUNDWORK

The Edutech Practice at CMR scanned its vast sector knowledgebase and updated it via an intense desk study during the initial preparatory foundation phase of the T-School Employability Index Survey. The goal of the initial groundwork phase was to locate and list all of India's technical schools and top hiring HR managers. Higher education institutions run by the government and private educational institutions were listed individually. The survey included colleges that were founded before 2017 and offered B.E., B. Tech., or similar-level graduate technical degrees and hiring HRs of top companies.

At the end of the desk research phase, an invitation was extended to all shortlisted institutions and HRs on behalf of DQ and CMR to participate in the nationwide survey.

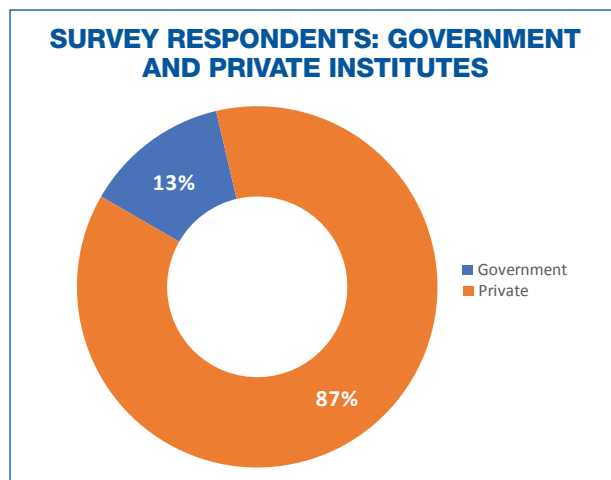### PHASE 2: PRIMARY RESEARCH

The T-Schools and HR managers shortlisted in Phase 1 were approached by the Edutech Practice at CMR. Online interviews were scheduled with these institutions and HRs to collect information around placements and hiring done within campus.

The survey saw participation of higher education institutions from both private and government sector. One in every eight institutes that participated in the DQ-CMR T-School Employability Index Survey 2021 was a government institute.

The survey had at least one T-School participating from each of the major states of India. Southern region-based T-Schools took the lead in participating in the survey, representing over 56% of the total number of respondent institutes. T-Schools from the West took a lead over those from the Northern and Eastern regions.

The data was collected using a standardised questionnaire with over 20 questions. These questions allowed the DQ-CMR team to create a comprehensive picture based on the T-Schools' input. The T-Schools had the option of sending nomination either online or in person. According to the market research code of ethics, the contributions were

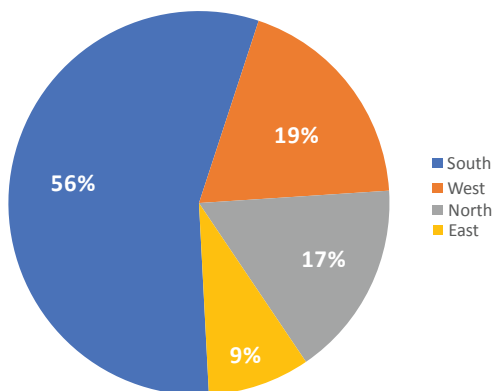**SURVEY RESPONDENTS: GOVERNMENT AND PRIVATE INSTITUTES**

13%

87%

■ Government
■ Private

ZONE-WISE DISTRIBUTION OF INSTITUTES

- 56% South
- 19% West
- 17% North
- 9% East

inspected by the CMR Edutech Practice for completeness and accuracy of data provided, as well as through a random check process, with >30% of the submissions being cross-checked. CMR analysts contacted key stakeholders for

further discussion, allowing for a comprehensive view of placements won by T-Schools.

The quantitative inputs from various T-Schools and HRs were then analysed, with absolute data being normalised to relative data in order to compare parameters among the participating institutions. Especially, the data collected from HR managers presented a number of insights such as the current job market in terms of opportunities, their hiring plans for the year and what they see in a candidate during recruitment, preferred cities, source for finding a suitable candidate, organisational challenges and employee well-being.

A final score was obtained for each of the parameters, which was then factored with the pre-defined weights to produce the overall employability index of each participating T-School. The institutes were then ranked, with the one having the highest overall score being placed first. The T-Schools' employability index was also used to create category- and region-wise rankings (see T-School Ranking in the following pages).

TOP CITIES FOR CAMPUS RECRUITMENTS

Cities	Recruitment
Delhi/NCR	100%
Mumbai	89%
Bangalore	87%
Chennai	69%
Pune	61%
Hyderabad	52%
Kolkata	48%

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MIET setup in 1999 is the first Engineering College in the private sector in J&K. It is the only one to be accredited with "A" Grade by the National Assessment and Accreditation Council (NAAC). MIET also finds place in the top 100 T-schools of India in the 2021 DataQuest survey, while the MIET School of Management figures in the top 100 B-Schools, ranked at 52nd spot in the RoI category by Business Today. MIET is also the first Autonomous College of Engineering in J&K.

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- **Faculty has filed 25 patents, published 1000+ papers and incubated 2 products.**

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Recruiters
50+

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Median Salary
4.5 LPA

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T-School **Employability Ranking 2021**
The overall Top 100 (government and private institutes)

INSTITUTE NAME	CITY	RANKING
Indian Institute of Technology, Kanpur	Kanpur	1
Indraprastha Institute of Information Technology, Delhi	New Delhi	2
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Chitkara University Institute of Engineering & Technology	Rajpura	10
Bannari Amman Institute of Technology	Sathyamangalam	11*
Maharaja Agrasen Institute of Technology	New Delhi	11*
College of Engineering Pune	Pune	12
Panimalar Engineering College	Chennai	13
Army Institute of Technology	Pune	14
Maharaja Surajmal Institute of Technology	New Delhi	15*
Rajalakshmi Engineering College	Chennai	15*
Sri Sai Ram College of Engineering	Bengaluru	15*
Chandigarh Engineering College	Mohali	16*
Koneru Lakshmaiah Education Foundation	Guntur	16*
RMK Engineering College	Chennai	17
VNR Vignana Jyothi Institute of Engineering & Technology	Hyderabad	18
Rungta College of Engineering & Technology	Bhilai	19
GL Bajaj Institute of Technology & Management	Noida	20*
GMR Institute of Technology	Rajam	20*

INSTITUTE NAME	CITY	RANKING
The NorthCap University	Gurugram	21
KCG College of Technology	Chennai	22
National Institute of Technology, Goa	Ponda	23
International Institute of Information Technology, Naya Raipur	Raipur	24*
Pimpri Chinchwad College of Engineering, Pune	Pune	24*
Reva University	Bengaluru	25
Erode Sengunthar Engineering College	Erode	26
The Oxford College of Engineering	Bengaluru	27
Dr NGP Institute of Technology	Coimbatore	28*
Vignan Institute of Technology & Science	Pochmapally Mandal	28*
Dr BR Ambedkar National Institute of Technology, Jalandhar	Jalandhar	29*
Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science & Technology	Chennai	29*
M Kumarasamy College of Engineering	Karur	30
K Ramakrishnan College of Engineering	Trichy	31
Aditya College of Engineering & Technology, Surampalem	Surampalem	32
Sreyas Institute of Engineering & Technology	Hyderabad	33
CMR College of Engineering & Technology	Hyderabad	34*
National Institute of Technology, Silchar	Silchar	34*
BMS Institute of Technology & Management	Bengaluru	35
Gandhi Institute for Education & Technology	Khordha	36
KKR & KSR Institute of Technology & Science	Guntur	37
Thiagarajar college of Engineering	Madurai	38
Budge Budge Institute of Technology	Kolkata	39*
Galgotias College of Engineering & Technology	Greater Noida	39*
Velagapudi Ramakrishna Siddhartha Engineering College	Vijayawada	40
CVR College of Engineering	Hyderabad	41

INSTITUTE NAME	CITY	RANKING
NMAM Institute of Technology	Udupi	42
Chhatrapati Shivaji Institute of Technology	Durg	43*
DKTE Society's Textile & Engineering Institute, Ichalkaranji	Ichalkaranji	43*
Acropolis Institute of Technology & Research	Indore	44*
CMR Engineering College	Hyderabad	44*
Ecole Centrale School of Engineering, Mahindra University	Hyderabad	45
Sir M Visvesvaraya Institute of Technology, Bangalore	Bengaluru	46
SJC Institute of Technology	Chikkballarpur	47
Gandhi Engineering College	Bhubaneswar	48*
Vel Tech Multi Tech Dr Rangarajan Dr Sakunthala Engineering College	Chennai	48*
GITA Bhubaneswar	Bhubaneswar	49
Yeshwantrao Chavan College of Engineering	Nagpur	50
Rajagiri School of Engineering & Technology	Kochi	51
KLS Gogte Institute of Technology, Belagavi	Belagavi	52
MVJ College of Engineering	Bengaluru	53
Hindusthan Institute of Technology	Coimbatore	54*
Kanpur Institute of Technology	Kanpur	54*
BRACT'S, Vishwakarma Institute of Information Technology	Pune	55
Vaagdevi College of Engineering	Warangal	56
SCMS SchooL of Engineering & Technology	Ernakulam	57
Hindusthan College of Engineering & Technology	Coimbatore	58
Prasad V Potluri Siddhartha Institute of Technology	Vijayawada	59
Government Model Engineering College, Kochi	Kochi	60*
RNS Institute of Technology	Bengaluru	60*
BNM Institute of Technology	Bengaluru	61*
Sri Manakula Vinayagar Engineering College	Puducherry	61*

INSTITUTE NAME	CITY	RANKING
Shri Ram Institute of Technology	Jabalpur	62
Annamacharya Institute of Technology & Sciences, Tirupati	Tirupati	63
IES College of Technology	Bhopal	64*
Institute of Technology, Nirma University	Ahemdabad	64*
Trident Academy of Technology, Bhubaneswar	Bhubaneswar	65
Sri Vasavi Institute of Engineering & Technology	Near Machilipatnam	66
Meerut Institute of Engineering & Technology	Meerut	67
BVRIT Hyderabad College of Engineering for Women	Hyderabad	68
Government College of Engineering Karad	Karad	69*
Muthayammal Engineering College	Rasipuram	69*
Velalar College of Engineering & Technology	Erode	70
CMR Institute of Technology	Hyderabad	71*
Lakireddy Bali Reddy College of Engineering	Mylavaram	71*
Rajarambapu Institute of Technology	Islampur	71*
Aditya Institute of Technology & Management	Tekkali	72
Aditya Engineering College, Surampalem	Surampaiem	73*
Institute of Aeronautical Engineering	Hyderabad	73*
Modern College of Engineering, Pune	Pune	74
RC Patel Institute of Technology	Shirpur	75
Rajshree Institute of Management & Technology, Bareilly	Bareilly	76
Nandha Engineering College	Erode	77*
Vardhaman College of Engineering	Hyderabad	77*
Pranveer Singh Institute of Technology	Kanpur Nagar	78
Ravindra College of Engineering for Women	Kurnool	79
Sanjivani College of Engineering, Kopargaon	Kopargaon	80
Shri Ram Murti Smarak College of Engineering & Technology	Bareilly	81*

INSTITUTE NAME	CITY	RANKING
Shri Sant Gajanan Maharaj College of Engineering	Shegaon	81*
Annamacharya Institute of Technology & Sciences, Rajampet	Rajampet	82
G Pullaiah College of Engineering & Technology	Kurnool	83*
Vidyavardhaka College of Engineering	Mysuru	83*
Amity School of Engineering & Technology	Jaipur	84
Aditya College of Engineering, Peddapuram	Peddapuram	85*
Er Perumal Manimekalai College of Engineering	Hosur	85*
PSIT College of Engineering	Kanpur	86
Faculty Of Engineering, Teerthanker Mahaveer University	Moradabad	87
Sasi Institute of Technology & Engineering	Tadepalligudem	88
Chettinad College of Engineering & Technology	Karur	89
School to Engineering, Cochin University of Science & Technology	Kochi	90
Malnad College of Engineering	Hassan	91
GH Patel College of Engineering & Technology	Vallabh Vidyanagar	92*
Srinivasa Ramanujan Institute of Technology	Anantapur	92*
Vindhya Institute of Technology & Science	Satna	93
Sri Venkateswara Engineering College	Tirupati	94
Model Institute of Engineering & Technology, Jammu	Jammu	95
Sri Venkateswara College of Engineering Tirupati	Tirupati	96
Sethu Institute of Technology	Virudhunagar	97
Mohandas College of Engineering & Technology	Thiruvananthapuram	98
SB Jain Institute of Technology Management & Research	Nagpur	99
CK Pithawalla College of Engineering & Technology	Surat	100

* These institutes share the same rank due to identical scores
Source: DQ-CMR T-School Employability Index 2021

Government T-School **Employability Ranking 2021**

INSTITUTE NAME	CITY	RANKING
Indian Institute of Technology, Kanpur	Kanpur	1
Indraprastha Institute of Information Technology, Delhi	New Delhi	2
International Institute of Information Technology, Hyderabad	Hyderabad	3
ABV- Indian Institute of Information Technology & Management, Gwalior	Gwalior	4
Netaji Subhas University of Technology	New Delhi	5
Maulana Abul Kalam Azad University of Technology	Haringhata	6
College of Engineering Pune	Pune	7
National Institute of Technology, Goa	Ponda	8
International Institute of Information Technology, Naya Raipur	Raipur	9
Dr BR Ambedkar National Institute of Technology, Jalandhar	Jalandhar	10
National Institute of Technology, Silchar	Silchar	11
Thiagarajar college of Engineering	Madurai	12
Vel Tech Multi Tech Dr Rangarajan Dr Sakunthala Engineering College	Chennai	13
Government Model Engineering College, Kochi	Kochi	14
Government College of Engineering Karad	Karad	15
School to Engineering, Cochin University of Science & Technology	Kochi	16
Malnad College of Engineering	Hassan	17

Source: DQ-CMR T-School Employability Index 2021

How Academic Institutions can assist IT Sector to address Unexpected Skillsets Scaling?

Post COVID is developing into a new phase of geometric growth for the Indian IT Sector. Customers across the world and across sectors are seeking new and innovative ways of cost reduction. Some of these customers, who were resisting the idea of outsourcing IT Services to external agencies and different geographies, have shown inclination to adapt themselves to the inevitable business model of shredding non-core, but critical business operations. Other corporates and IT product companies are looking at expanding and strengthening their existing IT and BPM operations in India.

The "Work-from-Home" has demonstrated that development and maintenance projects can be executed from any location other than office. The development and deployment teams can efficiently and effectively deliver outcomes sitting at home through online mode. All the activities related to project management, communication, administration, training and skills development can happen through online mode. For the companies catering to IT services sector, this is a boon as it has helped in substantial reduction of non-billable time spent on travelling and other administrative activities thus increasing the productivity and boosting the morale of the employees. At the same time, the corporates in the services sector are resorting to cut in expenses on real estate, infrastructure management and administration. These cuts have been passed on partially to the employees by upgradation of IT infrastructure and official infrastructure at their homes and improvement in digital connectivity. Overall through the increase in productivity and reduction in expenses, IT companies have margins available for passing on to their customers.

The customers are looking for quicker deployment of new technologies and applications. The IT Product companies are working on incorporating new requirements and providing support for their products seamlessly. These requirements need skillsets on latest methodologies and technologies. With skillsets, orientation towards innovation and design is also being sought. With increased business opportunities, they are also looking at both organic and inorganic ways of acquiring skillsets. The COVID situation has been used by IT companies to reskill their existing employees for redeployment as they themselves prepare for the new

Shri Puneet Agarwal
Vice Chairman, MIET GROUP OF INSTITUTIONS

challenges in the Post COVID world. Hectic recruitment is going on for acquiring skillsets available from the market.

Recruitment for fresh talent is also going on aggressively, but they need to be made employable and deployable on live projects by imparting technically relevant skillsets. The activities related to training of fresh talent requires time and resources in form of trainers. Also the trainings need to be done in physical mode to ensure quality and consistency. The trainers themselves are deployed on live projects and working against time. Hence companies are facing practical difficulties in withdrawing trained resources from billable projects to unbillable trainings.

At MIET, we are closely working with IT Product and services companies and taking feedbacks on their business requirements in terms of fresh talent. We are working with leading IT product companies in different domains and using the resources available at their disposal to train our Faculty on these latest methodologies and technologies. During the COVID period, IT product companies have made available plenty of resources like training materials, case studies, videos, exercise, problem statements, support etc. online and free. We have been fortunate to get free or concessional facilities for testing and certification from these IT product companies either directly or through their partners. Based on their interest and work allocation, Faculty have been identified to avail of

through virtual job fairs. Leading competency centers of MNCs in banking, manufacturing, telecom, retail, IT products, etc. gave offers to MIETians matching financial paypackets being offered by them at IITs and NITs. Students, who were offered internships in their final semester, have been confirmed at roles and salaries higher than that was promised at the time of selection because of their excellence performance during their internships. At the same time, the students have also submitted final year projects generating IPs through technical papers and patents, which can be used by their employers.

The learnings from the placement season of 2020-21 has cascaded down to the batch which is due for passing in 2021-22. Already students entering their final years are working on latest technologies and skillsets. Their aspirations have grown tremendously and it is hoped that they will be in a position to make suitable and relevant choices for their careers.

It is also being observed that while students are working on new upcoming technologies, live projects and contemporary

these resources and acquire skillsets & certifications. The Faculty in turn have been closely working with the students in guiding them the advantages of these special and focused skillsets and mentoring them to the point of their certifications. Some of the students have even gone beyond the desired level of capabilities in terms of the acquired skillsets.

The efforts were clearly visible during the placement season of 2020-21. Inspite of the COVID and lack of physical presence of students and companies on the campus, Meerut Institute of Engineering and Technology (MIET) and its sister campus - Meerut Institute of Technology (MIT) observed excellent placement seasons with IT Product and service companies vying for students with relevant skillsets. A few of world's leading IT product companies ensured that students trained on their skillsets were made available to their competency centers, implementation partners and customers

problem statements, they are coming with new ideas and innovations. At MIET, we are encouraging students to take up challenges and explore the possibility of converting these ideas into prototypes and then possible commercially viable solutions. MIET is also the center for Innovation (ACIC MIET Meerut- promoted by Atal Innovation Mission, Niti Aayog, Government of India for promoting innovation) and MIET Incubation Forum (MSME recognizes Incubator). The Innovation and Incubation facilities are available not only to our students, but also the local community. ACIC MIET Meerut actively seeks engagement from IT corporates and employees/enthusiasts in diiferent forms and ways for supporting its various initiatives promoting innovation, creativity and design thinking amongst the children and youth of the Northern part of the country specifically in states of Uttar Pradesh, Uttarakhand and NCR of Delhi.

Private Sector T-School **Employability Ranking 2021**

INSTITUTE NAME	CITY	RANKING
Bharati Vidyapeeth College of Engineering	Pune	1
Amity School of Engineering & Technology, Raipur	Raipur	2*
Amity School of Engineering & Technology, Lucknow	Lucknow	2*
BS Abdur Rahman Crescent Institute of Science & Technology	Chennai	3
Chitkara University Institute of Engineering & Technology	Rajpura	4
Bannari Amman Institute of Technology	Sathyamangalam	5*
Maharaja Agrasen Institute of Technology	New Delhi	5*
Panimalar Engineering College	Chennai	6
Army Institute of Technology	Pune	7
Maharaja Surajmal Institute of Technology	New Delhi	8*
Rajalakshmi Engineering College	Chennai	8*
Sri Sai Ram College of Engineering	Bengaluru	8*
Chandigarh Engineering College	Mohali	9*
Koneru Lakshmaiah Education Foundation	Guntur	9*
RMK Engineering College	Chennai	10
VNR Vignana Jyothi Institute of Engineering & Technology	Hyderabad	11
Rungta College of Engineering & Technology	Bhilai	12
GL Bajaj Institute of Technology & Management	Noida	13*
GMR Institute of Technology	Rajam	13*
The NorthCap University	Gurugram	14
KCG College of Technology	Chennai	15
Pimpri Chinchwad College of Engineering, Pune	Pune	16

INSTITUTE NAME	CITY	RANKING
Reva University	Bengaluru	17
Erode Sengunthar Engineering College	Erode	18
The Oxford College of Engineering	Bengaluru	19
Dr NGP Institute of Technology	Coimbatore	20*
Vignan Institute of Technology & Science	Pochmapally Mandal	20*
Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science & Technology	Chennai	21
M Kumarasamy College of Engineering	Karur	22
K Ramakrishnan College of Engineering	Trichy	23
Aditya College of Engineering & Technology, Surampalem	Surampalem	24
Sreyas Institute of Engineering & Technology	Hyderabad	25
CMR College of Engineering & Technology	Hyderabad	26
BMS Institute of Technology & Management	Bengaluru	27
Gandhi Institute for Education & Technology	Khordha	28
KKR & KSR Institute of Technology & Science	Guntur	29
Budge Budge Institute of Technology	Kolkata	30*
Galgotias College of Engineering & Technology	Greater Noida	30*
Velagapudi Ramakrishna Siddhartha Engineering College	Vijayawada	31
CVR College of Engineering	Hyderabad	32
NMAM Institute of Technology	Udupi	33
Chhatrapati Shivaji Institute of Technology	Durg	34*
DKTE Society's Textile & Engineering Institute, Ichalkaranji	Ichalkaranji	34*
Acropolis Institute of Technology & Research	Indore	35*

INSTITUTE NAME	CITY	RANKING
CMR Engineering College	Hyderabad	35*
Ecole Centrale School of Engineering, Mahindra University	Hyderabad	36
Sir M Visvesvaraya Institute of Technology, Bangalore	Bengaluru	37
SJC Institute of Technology	Chikkballarpur	38
Gandhi Engineering College	Bhubaneswar	39
GITA Bhubaneswar	Bhubaneswar	40
Yeshwantrao Chavan College of Engineering	Nagpur	41
Rajagiri School of Engineering & Technology	Kochi	42
KLS Gogte Institute of Technology, Belagavi	Belagavi	43
MVJ College of Engineering	Bengaluru	44
Hindusthan Institute of Technology	Coimbatore	45
Kanpur Institute of Technology	Kanpur	46
BRACT's Vishwakarma Institute of Information Technology	Pune	47
Vaagdevi College of Engineering	Warangal	48
SCMS School of Engineering & Technology	Ernakulam	49
Hindusthan College of Engineering & Technology	Coimbatore	50
Prasad V Potluri Siddhartha Institute of Technology	Vijayawada	51
RNS Institute of Technology	Bengaluru	52
BNM Institute of Technology	Bengaluru	53*
Sri Manakula Vinayagar Engineering College	Puducherry	53*
Shri Ram Institute of Technology	Jabalpur	54
Annamacharya Institute of Technology & Sciences, Tirupati	Tirupati	55

INSTITUTE NAME	CITY	RANKING
IES College of Technology	Bhopal	56*
Institute of Technology, Nirma University	Ahemdabad	56*
Trident Academy of Technology, Bhubaneswar	Bhubaneswar	57
Sri Vasavi Institute of Engineering & Technology	Near Machilipatnam	58
Meerut Institute of Engineering & Technology	Meerut	59
BVRIT Hyderabad College of Engineering for Women	Hyderabad	60
Muthayammal Engineering College	Rasipuram	61
Velalar College of Engineering & Technology	Erode	62
CMR Institute of Technology	Hyderabad	63*
Lakireddy Bali Reddy College of Engineering	Mylavaram	63*
Rajarambapu Institute of Technology	Islampur	63*
Aditya Institute of Technology & Management	Tekkali	64
Aditya Engineering College, Surampalem	Surampaiem	65*
Institute of Aeronautical Engineering	Hyderabad	65*
Modern College of Engineering, Pune	Pune	66
RC Patel Institute of Technology	Shirpur	67
Rajshree Institute of Management & Technology, Bareilly	Bareilly	68
Nandha Engineering College	Erode	69*
Vardhaman College of Engineering	Hyderabad	69*
Pranveer Singh Institute of Technology	Kanpur Nagar	70
Ravindra College of Engineering for Women	Kurnool	71
Sanjivani College of Engineering,Kopargaon	Kopargaon	72
Shri Ram Murti Smarak College of Engineering & Technology	Bareilly	73*

INSTITUTE NAME	CITY	RANKING
Shri Sant Gajanan Maharaj College of Engineering	Shegaon	73*
Annamacharya Institute of Technology & Sciences, Rajampet	Rajampet	74
G Pullaiah College of Engineering & Technology	Kurnool	75*
Vidyavardhaka College of Engineering	Mysuru	75*
Amity School of Engineering & Technology	Jaipur	76
Aditya College of Engineering, Peddapuram	Peddapuram	77*
Er Perumal Manimekalai College of Engineering	Hosur	77*
PSIT College of Engineering	Kanpur	78
Faculty of Engineering, Teerthanker Mahaveer University	Moradabad	79
Sasi Institute of Technology & Engineering	Tadepalligudem	80
Chettinad College of Engineering & Technology	Karur	81
GH Patel College of Engineering & Technology	Vallabh Vidyanagar	82*
Srinivasa Ramanujan Institute of Technology	Anantapur	82*
Vindhya Institute of Technology & Science	Satna	83
Sri Venkateswara Engineering College	Tirupati	84
Model Institute of Engineering & Technology, Jammu	Jammu	85
Sri Venkateswara College of Engineering Tirupati	Tirupati	86
Sethu Institute of Technology	Virudhunagar	87
Mohandas College of Engineering & Technology	Thiruvananthapuram	88
SB Jain Institute of Technology Management & Research	Nagpur	89
CK Pithawalla College of Engineering & Technology	Surat	90

* These institutes share the same rank due to identical scores
Source: DQ-CMR T-School Employability Index 2021

Regional T-School **Employability Ranking 2021**

East

INSTITUTE	CITY	RANK
Amity School of Engineering & Technology, Raipur	Raipur	1
Maulana Abul Kalam Azad University of Technology	Haringhata	2
Rungta College of Engineering & Technology	Bhilai	3
International Institute of Information Technology, Naya Raipur	Raipur	4
National Institute of Technology, Silchar	Silchar	5
Gandhi Institute for Education & Technology	Khordha	6
Budge Budge Institute of Technology	Kolkata	7
Chhatrapati Shivaji Institute of Technology	Durg	8
Gandhi Engineering College	Bhubaneswar	9
GITA Bhubaneswar	Bhubaneswar	10

West

INSTITUTE	CITY	RANK
ABV Indian Institute of Information Technology & Management, Gwalior	Gwalior	1
Bharati Vidyapeeth College of Engineering	Pune	2
College of Engineering Pune	Pune	3
Army Institute of Technology	Pune	4
Pimpri Chinchwad College of Engineering, Pune	Pune	5
DKTE Society's Textile & Engineering Institute, Ichalkaranji	Ichalkaranji	6
Acropolis Institute of Technology & Research	Indore	7
Yeshwantrao Chavan College of Engineering	Nagpur	8
BRACT'S Vishwakarma Institute of Information Technology	Pune	9
Shri Ram Institute of Technology	Jabalpur	10

North

INSTITUTE	CITY	RANK
Indian Institute of Technology, Kanpur	Kanpur	1
Indraprastha Institute of Information Technology, Delhi	New Delhi	2
Netaji Subhas University of Technology	New Delhi	3
Amity School of Engineering & Technology, Lucknow	Lucknow	4
Chitkara University Institute of Engineering & Technology	Rajpura	5
Maharaja Agrasen Institute of Technology	New Delhi	6
Maharaja Surajmal Institute of Technology	New Delhi	7
Chandigarh Engineering College	Mohali	8
GL Bajaj Institute of Technology & Management	Noida	9
The NorthCap University	Gurugram	10

South

INSTITUTE	CITY	RANK
International Institute of Information Technology, Hyderabad	Hyderabad	1
BS Abdur Rahman Crescent Institute of Science & Technology	Chennai	2
Bannari Amman Institute of Technology	Sathyamangalam	3
Panimalar Engineering College	Chennai	4
Rajalakshmi Engineering College	Chennai	5*
Sri Sai Ram College of Engineering	Bengaluru	5*
Koneru Lakshmaiah Education Foundation	Guntur	6
RMK Engineering College	Chennai	7
VNR Vignana Jyothi Institute of Engineering & Technology	Hyderabad	8
GMR Institute of Technology	Rajam	9
KCG College of Technology	Chennai	10

* These institutes share the same rank due to identical scores
Source: DQ-CMR T-School Employability Index 2021

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HARSHVENDRA SOIN
Global Chief People Officer &
Head – Marketing, Tech Mahindra

"TALENT ACQUISITION IS A TREASURE HUNT – NOT A SEARCH

*A veteran with 26 years of industry experience, **Harshvendra Soin**, Global Chief People Officer and Head – Marketing, Tech Mahindra, is responsible for leading the company's HR processes and policies. In an interaction with Dataquest, he talks about the impact of COVID-19 on hiring, the company's talent acquisition strategy, including from Tier 2 and 3 cities, and transformation of the workforce to meet future needs. Excerpts:*

Reports indicate that Tech Mahindra is planning to hire three times more freshers than the normal year. What has triggered this hiring spree despite the pandemic?

The pandemic has accelerated digital transformation projects for businesses, leading to an increased demand for professionals adept in digital or niche technologies. Our biggest focus for FY22 is on building skills and keeping our talent pool brimming with new-age technologies. We continue to hire in focused verticals like artificial intelligence (AI), internet of things (IoT), cyber security, deep tech and space tech, among others, and strengthen our leadership for the technology sector as well. We are also diversifying our talent pool by going global for talent acquisition as well as increasing hiring from Tier 2 Indian cities, especially at the 'bottom of the pyramid'.

We have also introduced several employee-engagement initiatives to encourage associates to upskill and once they get deployed on projects requiring niche skills, they benefit financially as well.

While the company is focusing on hiring in new technology areas like AI, IoT, and space technology, what are the other key areas for which you may hire from the T-Schools?

In order to enable end-to-end digital transformation for global customers, Tech Mahindra is focused on leveraging next-generation technologies including 5G, deep-tech, blockchain, cyber security, AI and more. While we are keen to build leadership in cognitive technologies such as IoT, automation, blockchain and AI, we are also endeavouring to hire people in the domain of space technology. By charting the full spectrum of technologies and diversifying our fresher talent pools by recruiting science graduates, diploma holders and certified skilled undergrads in various emerging technologies, we are leaving no stone unturned to help the world experience the magical aura of technology.

The company also seems to be focusing on hiring from Tier 2 and 3 cities. How employable are talents

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WHILE WE ARE KEEN TO BUILD A LEADERSHIP IN COGNITIVE TECHNOLOGIES LIKE IOT, AUTOMATION, BLOCKCHAIN AND AI, WE ALSO ENDEAVOUR TO HIRE IN SPACE TECHNOLOGY.

from these cities in terms of meeting the new-age technology requirements?

Post-COVID generations will see themselves as a set of skills and their career as an experience, rather than a direct path to a title and salary. With organisations accepting hybrid working as the new work paradigm, the people now have the freedom and flexibility to work from anywhere as per their convenience. This is making Tier 2 and 3 cities emerge as future talent hubs because of good skill availability. In tandem with this trend and to strengthen our talent pipeline, we are also hiring expeditiously from Tier 2 cities. I firmly believe that talented human resources can make any city an attractive destination for investment in the IT sector.

As far as hiring criteria are concerned, we obviously look for educational qualification, skills, both technical and cognitive, as well as their ability to learn and motivational fit. We believe that the 'right attitude', motivation and the ability to adopt and adapt, is all that is needed today to make any person 'employable'.

I believe talent acquisition is a treasure hunt – not a search, as there is abundant treasure of talent available in our nation today; one only has to proactively look beyond the set boundaries to locate talent which fits in with future business requirements.

How will you describe the talent acquisition strategy of Tech Mahindra in India and elsewhere? What is the

average annual mix of fresh T-School graduates and talent with experience?

As a technology firm, we greatly rely on the right talent for servicing customer needs, business sustainability, and future growth. We therefore have a robust system for talent acquisition and retention. The pandemic has gushed into our lives and has changed everything, including the skills that we will be hiring for in future, including technical, behavioural as well as softer skills.

At Tech Mahindra, we are looking at diversifying our talent in delivery centres across Eastern Europe and Latin America over the next few years to provide a buffer against the war for talent currently going on in India. We want to widen the talent pool, improve agility to deliver some solutions, and be closer to clients. We also have in place various up-skilling and re-skilling initiatives for our associates, enabling them to upgrade career opportunities for them and allowing us to retain the density of our talent pool while also building the workforce of the future that is at the forefront of cutting-edge technologies.

In Q1FY22, we added 5,200 employees and plan to increase the fresher intake by 3x this year. The hiring will be in emerging technologies such as AI, IoT, deep tech and space tech, among others.

Recent research indicates that companies in India may see higher salary costs in the coming quarters as they

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WITH ORGANISATIONS ACCEPTING HYBRID WORKING AS THE NEW WORK PARADIGM, PEOPLE NOW HAVE FREEDOM AND FLEXIBILITY TO WORK FROM ANYWHERE AS PER THEIR CONVENIENCE.

bridge the demand-supply gap through salary hikes and incentives, as also stock options. What is your expectation based on the experience so far in 2021?
The COVID era has radically improved everyone's hold over technology. Due to the high demand for technical superiority, employees have laboured to sharpen their technical skills that have been proving to be very essential during the pandemic. However, the demand-supply gap between fresh talent and the skill demands of the IT services industry is only going to increase in the coming days, and talent, which is limited, will inevitably be expensive. Clearly, hiring based on specific talents will come at a higher cost as demand for digital talents is humongous. Today, clients are willing to pay the premium for world-class experiences they expect while endeavouring to speed up their digital transformation. I expect to see a revolution of re-skilling sweeping across the IT industry in efforts to bridge the demand-supply gap and give a greater number of associates the chance to rise.

From Tech Mahindra's perspective, I feel our re-skilling and up-skilling initiatives, the trust of customers, 5G, and digital offerings have worked in favour of the organisation. We are witnessing demand revival across multiple segments, as customers have accelerated their pace of digital transformation. As a ripple effect of this, our growth has been commendable. This has

been possible because of the undying efforts of our talented associates and salary hikes, or incentives are a gesture of our appreciation for their quality contribution. Maintaining the current growth trajectory for the rest of the year, or improving it further, will churn out enough to bear higher salary costs and re-skill associates to help them remain relevant.

While the salaries are going up due to the demand-supply dynamics, so are the bill rates. In addition, we have multiplied our efforts on up-skilling the existing workforce as well as increased hiring at the bottom of the pyramid. We are also exploring newer avenues to hire from Tier 2 cities and untapped global destinations, and experimenting with innovative employee engagement programmes to keep the morale high.

The digital normal is leading to a massive disruption and emergence of newer technologies, making skill upgrade and cross platform training very important. What is the company doing to keep pace with the need for new skill sets?
Tech Mahindra is imagining a future that we can deliver on. Hence, finding skilled employees and up-skilling/ re-skilling the existing associates, who can help us in envisioning the future, is imperative. There is a pressing need for organisations to transform workforce both at speed and scale. This is accelerating re-skilling and up-

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IN Q1FY22, WE ADDED 5,200 EMPLOYEES AND PLAN TO INCREASE THE FRESHER INTAKE BY 3X THIS YEAR. HIRING WILL BE IN EMERGING TECHNOLOGIES SUCH AS AI, IOT AND SPACE TECH.

skilling initiatives at companies to keep up with the pace of technological developments and build a 'future-ready' talent pool.

Under Future Skilling Initiative, we have identified over 17 competencies where a bulk of IT solutions and services is expected to be developed in future. With an aim to equip our global workforce with these new-age skills, we have launched an AI-based platform, NAD Learn (formerly called 'UaaS' – Up-skilling as a Service), powered by a 'New Age Delivery' engine to provide interactive, on-demand, contextual and hyper-personalised up-skilling to our associates in self-service mode. Developed in-house, the learning platform accelerates skill development to meet the people supply chain needs of organisations coping with the recent business challenges brought on by the COVID-19 pandemic. We also plan to make this platform available to not just our associates, but also to academia so that students are industry-ready when they graduate.

Other skilling initiatives include WFH101, an eLearning module, EMBARK, F2F (Fast Forward to Future), LEAP, ELEVATE, Project Skilling and RIDE Future Skilling. These programmes – in addition to the existing ELITE engineering graduate hiring, management trainee programme for hiring fresh talent from B-schools, and Global Leadership Cadre programme for fast-tracking the growth of young leaders – will help us in 'reversing the pyramid' and provide fresh graduates the opportunity to become 'fit for the future'. Going forward, we will be focusing on undertaking domain-skilling as well as special-skilling programmes for open positions and high demand areas of architecture and cloud. We will look to scale and enhance the ELEVATE Internship programme to improve the quality of interns. Additionally, partnerships with leading learning institutions would be on anvil for us to provide more learning avenues to our associates.

How has the social distancing norm impacted campus hiring? How is the company handling it? Does remote hiring not compromise the quality evaluation?
The campus hiring under the social distancing norm has taken an intense virtual route for us. We adopted proctoring through various updated assessment formats to ensure integrity and prevent any unfairness. The company is using technology on a large scale to make the recruitment and engagement programmes faster and more efficient. In pre-pandemic times, the in-person campus drives used to be sometimes restricted to nearby campuses. However, the pandemic situation has given us the silver line advantage to reach out to the campuses across the globe and thereby multiplied our pool of talent.

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- Apeejay School, Panchsheel Park, New Delhi
- Apeejay School International (IB), Panchsheel Park, New Delhi
- Apeejay School, Saket, New Delhi
- Apeejay School, Pitampura, Delhi
- Apeejay School, Noida, U.P., Near Delhi

- Apeejay International School, Greater Noida, U.P.
- Apeejay School, Faridabad, Haryana
- Apeejay Svrán Global School, Faridabad
- Apeejay School, Charkhi Dadri, Haryana
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RITUPARNA MANDAL
General Manager, MediaTek

" INDIA IS IMPORTANT IN TERMS OF THE UNDERLYING TALENT POOL

*As General Manager of MediaTek Bangalore and Director of the Advanced Technology team, **Rituparna Mandal** is responsible for foundation IP and advanced CPU designs across MediaTek products. She is the founder of Immensa Semiconductors that created foundation IP portfolio in leading edge technologies across top foundries, as well as worked with several Tier-1 companies to develop custom IP for them before the company was acquired by MediaTek. In an interaction with Dataquest, she talks about its hiring strategy for R&D engineers, the technology focus areas, the company's approach to nurturing talent, and what T-Schools should do to make courses more relevant for the industry. Excerpts:*

MediaTek has been focusing on acquiring home-grown talent and has over 700 R&D engineers in India. What is the company's hiring philosophy and strategy?

We are consistently working towards the vision of democratising technology and making great technology available to everyone. In our quest to create innovative technology, we are always looking for talented people to work in our corporate offices around the world. We offer competitive salaries, a range of benefits and personalised programmes for professional development. Our aim is to hire managerial and technical leaders who can help

us make a quantum leap in innovation and enable us to achieve our revenue targets.

What is the company's expansion plan in India in terms of talent acquisition?

We have expanded our approach for recruiting talent by formulating annual talent plans in accordance with our operational strategies. We also acquire new employees through the talent application systems on our corporate website which offers applicants with a user-friendly interface and processes so as to increase the convenience of job applications. Additionally, we recruit talent through

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OUR AIM IS TO HIRE MANAGERIAL AND TECHNICAL LEADERS WHO CAN HELP US MAKE A QUANTUM LEAP IN INNOVATION AND ENABLE US TO ACHIEVE OUR REVENUE TARGETS.

job banks, participation in major recruitment events, and employee referrals. We also actively collaborate with key schools, and our accumulated investment in industry-academia collaboration up to now has surpassed 1.2 billion NTD. For 2021, we plan to hire a significant number of engineers to solidify our position as market leaders in the semiconductor industry.

What technology areas are you focusing on in terms of hiring talents in India? What is the average percentage of fresh T-School graduates that the company hires?

To continue the optimisation of MediaTek's talent structure, we not only focus on indicators for new hires and employee turnover, but also pay close attention to the number of applications per job, offer-to-acceptance rates, and development and retention of new hires. We hope we can continue to attract the best individuals, from a highly competitive talent market, to work with us, by adopting methods such as our Care System for new hires and exit interviews. In 2020, we hired 1,769 new employees worldwide. Of those, around 70% were younger than 30 years; we believe that a talent structure skewed in favour of the younger generation can bring more insights and momentum into our diversified products and innovations.

Since the company is working on cutting-edge technologies to meet the changing industry demand, are you happy with the quality of talent in India? What does the country need to do to make technical education more industry oriented?

India holds an important place as a market for MediaTek and also in terms of the underlying talent pool. We have about 650 people engaged in R&D in India and are looking at growing it further. MediaTek, a key partner to the country's growth story, is taking its commitment to support domestic innovation, smartphone design and production a step further by offering expertise, fostering development of talent, and building closer partnerships with Indian companies. Our aim is to create new, India-designed products for the indigenous market. The experience employees gain in the classroom and on-location at MediaTek's Taiwan headquarters continues to pay dividends for handset design engineers in India and we feel this is one way in which the country can prepare its technical students for industry participation. Creating opportunities for tie-ups between educational institutes and the industry can go a long way in fostering ambition and skills in the students.

The company prides itself on having among the highest employee retention in the industry. What is MediaTek's

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WE BELIEVE A TALENT STRUCTURE SKEWED IN FAVOUR OF THE YOUNGER GENERATION CAN BRING MORE INSIGHTS AND MOMENTUM INTO OUR DIVERSIFIED PRODUCTS AND INNOVATIONS.

approach to nurturing talent and motivating them for a long haul?

In order to help our new employees adapt to our work environment and thereby increase the retention rate, we established a 'Care System for new hires' in 2009. Our system automatically sends out an Adaptation Survey and Feedback Survey for new hires – both five-point scale surveys – on the seventh day and 30th day after new hires have reported for work. The completion rate of the survey has remained around 85%. Employees who have passed their probation periods must also fill out the 'completion of probation period survey'. We have also established a 'buddy system' where we designate employees from appropriate departments to serve as 'buddies' for new hires and help them adapt to their work. The results of the Adaptation Survey for new hires are shared with buddies. Besides, if the results of the Feedback Survey for new hires are not in line with our expectations, psychologists at the Employee Relationship department take the initiative in providing required care and guidance.

In the post-pandemic WFH era, the people management focus has shifted to health and well-being and workplace transformation. How are you dealing with it?

MediaTek values employee experiences and strives to help each employee enjoy their work. Employees derive positive experiences from different things, so we are active in communicating with our employees as we seek to understand their motivations through a variety of channels. We provide benefits that exceed legal compliance requirements and aim to take care of physical and mental health, and work-life balance of our colleagues. We have established an inclusive workplace that allows each employee to fully shine and grow on the international stage.

What new role do you see mentors, recruiters and instructors playing as the world moves closer to humans in the human-in-the-loop era driven by AI- and ML-based platforms?

MediaTek plans to collaborate with Indian software companies to develop AI-based applications which would be in high demand with the adoption of emerging 5G technologies. Next-generation technologies like AI and machine learning help devices customise on their own as per the habit or usage pattern of customers. MediaTek is now expanding its India business in segments such as telecom networks, internet of things and consumer electronics, and will set up labs and other resources to foster research and development jobs. Mentors, recruiters and instructors will play a major role in the hybrid new normal and we aim to be at the forefront of the upcoming transition.

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Going **beyond technology**

All professions need some tech skills. For a better career, these must be supplemented with others skills – of decision-making, negotiations, strategic thinking...

'Without sharpening your weapon, standing on the battlefield would not increase your chance of winning' – is a wise quote I read recently. Today skills are the weapon we have, to protect ourselves from the vast uncertainties that the future may have in store. We all hear about acquiring skills in the domains of cloud, data science, quantum, cyber security and so on, but we need to understand that these technologies are not limited to engineering students alone. A lot of these are becoming a part and parcel of education in general.

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WHILE UNTIL A FEW YEARS AGO THE PREVAILING VIEW OF 'DECISION-MAKING' WAS HIERARCHICAL, TODAY DECISION-MAKING AT ALL LEVELS HAS BECOME PREVALENT.

Medical students are trying to understand how technology is being applied to the vast domain of healthcare including data collection through devices, all the way to analysis and prediction of health of individuals. Lawyers are looking at not just automation and simplification of complex processes but also how vast amounts of data help in better decision-making. Technology in education has become the basis of a holistic learning. It is hence important to take learning technology head on, no matter which profession you are in. Adding to technology are many other skills, or maybe we can even call them traits, that one needs to be successful in the 21st century.

MAKE BETTER DECISIONS WITH NEGOTIATION SKILLS

While until a few years ago the prevailing view of 'decision-making' was hierarchical, today decision-making at all levels has become prevalent. Previously, people at the top of the pyramid (be it at work or family or even politics for that matter) took decisions and people at the bottom of the pyramid were expected to follow. Today it has become increasingly necessary to have good decision-making skills at all levels, given that the world is now flatter and more global. One has to accomplish work by relying on several individuals and organisations over which we exercise no direct control.

Be it employees, peers or even children we cannot accomplish anything by giving orders. We are compelled to negotiate and negotiating skills hence becomes one of the must-have skills today to aid good decision making. One of the books I read recently on negotiating skills, 'Getting to Yes' by Roger Fisher and William Ury, opened my eyes on how negotiation is one the key learning one needs for work or life. Negotiation is not about winning. It is about coming to a win-win solution and no one goes out winning or losing. The three main mantras it focuses on are: 'Don't Bargain over positions', 'Separate people from the problem' and 'Insist on an objective criterion'.

STRATEGIC THINKING IS THE KEY TO SUCCESS

Coming to the next facet that I discovered as the very key to being successful in any profession is strategic thinking. One needs to split strategic thinking, strategic planning and strategic execution in three different buckets. Spending time in executing more than thinking or planning is how most of us end up just leading our lives because there is always an arduous, growing list of tasks around us that can keep us busy from morning to night. What we do is play 'catch up' all the time.

I decided to make a shift in controlling how I spend my time and how I work. Let me explain both of these as they really are different. On work, I started reading

> RESEARCHING AN AREA OR STAYING CURRENT ON A TOPIC OF INTEREST, KNOWING WHAT COMPETITION IS DOING CAN MAKE ONE IMPROVE STRATEGIC THINKING DRASTICALLY.

more and staying more up-to-date on what was current. Remember, you can become an expert at anything on which you spend even 30 minutes a day for many days or months. Researching an area or staying current on a topic of interest, knowing what competition is doing can make one improve strategic thinking drastically. Having the clarity of the big picture and seeing how one's work fits into the overall scheme of things such as a company's strategy, government's vision and so on can have much more meaningful results.

On how I spend my time more strategically, I realised that if I were to let my mailbox drive me, I could spend years and I would have done just that but if I took control on where I wanted to head five years or 10 years from now and made little steps towards that, I would be strategically aligning with my own larger mission or goal. Remember to spend the largest amount of time in strategic thinking and then in planning and least in execution for a perfect mix. For freshers who are just starting work, it is the key to have a goal of where you see yourselves five or 10 years from now and ensure you make time every week to read, research and think more than you plan or execute.

MAKE YOURSELF VISIBLE AND NETWORK FOR GREATER IMPACT

Last, but not the least, you need to create visibility for yourself and your work with the right stakeholders. Many of us believe that making work visible is something that does not need focus or happens on its own. Remember we are not alluding to bragging here. We are talking about ensuring that people know about what you do, to be able to get the right attention of stakeholders, customers, managers, peers, mentors and so on. Gaining visibility also helps in being part of relevant networks. Networking goes a long way in shaping one's career. For example: The use of social networking platforms like LinkedIn helps establish visibility both for you and your company. But that also does not mean one should be posting just for the sake of doing so. Posts need to be meaningful and read-worthy, if I may call it so.

Having said that, it is important to understand that key technology skills supplemented with the skills of good decision-making, negotiation skills, strategic thinking, creating visibility and networking create a distinguished combination for an accomplished career. To top it all, follow this quote by famous philosopher Confucius: "Choose a job you love and you will never have to work a day in your life."

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Breaking the **glass ceiling**

The pandemic has turned the tables in the IT industry. Now, anyone who has a great idea for a product or service can enter the arena without any special pass

Two decades ago, while working for an IT networking tech firm, I tried hard to convince telecom operators to embrace IP technology to carry their voice, data and video traffic on data networks. No one believed in our vision at the time. They thought that we were peddling snake oil. One day, with great difficulty, I got a meeting with the chairman of one of the premier telecom players of the time. I was informed that the entire leadership team would be there, gathered, to listen to our revolutionary ideas (though bizarre at that time). We wanted to pitch the idea of a

robust, scalable IP backbone that would carry all types of traffic, not just data.

Finally, the D-Day came. My team and I reached the corporate office well in time. We were chaperoned politely into the boardroom. Soon, the chairman arrived. After the usual polite introductions, I was asked to begin my presentation. Five minutes in, the chairman looked at his watch and excused himself. He said that he had an urgent call to make. I guess, the tough message that was being given to us was that we were not 'telecom network' class players, but ragtag IT

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DURING THE PANDEMIC, WE LEARNT TO WORK WITH GREAT SPEED AND AGILITY, ADJUSTING MARVELOUSLY TO THE CHANGED CIRCUMSTANCES, IN DOUBLE QUICK TIME.

equipment folks, foolishly venturing into the brave new world of telecom.

No sooner had he left the room, all the executives started excusing themselves, one by one. Within a few minutes, we were left alone to eat humble pie and make our way out of the building. Before leaving, we were asked to hand over our presentation on a memory stick, "just in case". We licked our wounds and came back to our office in a rather sombre mood. Our goal that afternoon was to make a pitch, for MPLS networks, which would, in a very bandwidth-efficient fashion allow service providers to offer voice, data, and video services seamlessly to businesses and consumers.

No one then wanted to accept or believe that high-quality voice and video could be delivered over a data network. Our pitch may have seemed to be too futuristic. We were not talking of convergence, but conversion.

A couple of years later, as the world moved on, I was invited to an event on the future of telecom networks. Lo and behold, the same operator who had politely nudged me out of his boardroom (we were not even offered a cup of tea) was one of the keynote presenters. As they presented, I was dumbfounded. I saw my very own slides being played back, word by word! I just smiled and sat smug for the rest of the event. I had the feeling of great satisfaction that they had finally got converted. There

was an important lesson I learnt that evening. If you have conviction, keep trudging. You will eventually prevail.

Fast-forward to the pandemic. We have undoubtedly learnt some very new and valuable lessons. For one, we have worked with great speed and agility, adjusting marvelously to the changed circumstances, in double quick time. We have learnt the art of working rather efficiently. In fact, each one of us has innovated, and found new solutions, new ways of supporting our customers, new ways of engaging with our teams to keep them motivated and new ways of making money. All of these of course powered by IP networks! Many organisations have pivoted their fundamental business models and introduced a surprising range of new products. A sanitary napkin manufacturer has got into the business of high-quality face masks, liquor firms have started making sanitisers. Perhaps no other event has accelerated the adoption of digital technologies more than the pandemic.

Many folks ask me what the post-COVID-19 economy will look like. One thing is for sure, it is going to be very different. The lessons learnt during the pandemic are not going to be forgotten. Some things are going to remain forever. The change in consumer behaviour is one good example. Having got used to shopping online and getting great deals, consumers will keep coming back to these platforms. Stickiness will stay for good. Higher volume of

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> THE PANDEMIC HAS CHANGED CONSUMER BEHAVIOUR. HIGHER VOLUME OF ONLINE PURCHASING WILL OPEN UP NEW OPPORTUNITIES IN WAREHOUSING, LOGISTICS AND LAST MILE DELIVERY.

online purchasing will open up many new opportunities in the area of warehousing, logistics and last mile delivery.

New-age consumers have become very altruistic. They care for the environment a lot more. The thought of the earth becoming 1.5 degrees warmer in the not-so-distant future is worrying. New-world, post-pandemic customers are going to be more concerned about the environment. They will care if the delivery boy is turning up in a guzzler or an eco-friendly electric vehicle. Also, the convenience of digital payments (no touching please) is here to stay. It is not just about someone ensuring that you receive what you want at your doorstep, but more importantly about the process and care by which it reaches the customer. Images of clean air, beautiful blue skies, rare bird sightings have all made headlines. Everyone has suddenly recognised the need to focus on the impact of climate change. Evaluating vendors on their outlook towards saving the environment and approach to sustainability has become key. Which packing material is the food being delivered in is as important as the quality of the food itself.

Your customers watch you more closely than you think. Did you step up and stand up to be counted? How did you help those less fortunate than you? What are you doing for your community? Did you help your employees through the tough times? All of a sudden, customers have started giving premium to vendors who are behaving more responsibly. Everyone wants to be associated with an organisation that has a purpose beyond making the shareholder richer.

So, what will the future look like? For one, it is going to be very different from what we had envisaged prior to the pandemic. The pace of innovation has increased manifold through the pandemic. Digital transformation and the focus thereon is non-reversible. Winners will invest more feverishly here. There is a huge opportunity for those who can help organisations across industries in their digital journey. Focus on the environment, societal engagement and governance is going to be important. Organisations will start reporting around these areas, in addition to financial metrics. There is also a huge opportunity for vendor partners to step up and help their customers as they go through this new transformation.

The future is going to be far more exciting than what we have seen in the past. No one is going to let you get out of the boardroom in a jiffy, if you have the right idea or product.

After all, eventually, voice and video did ride the data networks.

Chugh is a four-decade IT industry veteran
The views expressed are personal.

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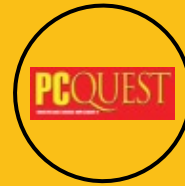
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Never **'fix and forget'**, but **'learn and evolve'**

Deploying machine learning or artificial intelligence is not enough. We need to continuously monitor their performance as we still know little about these tools
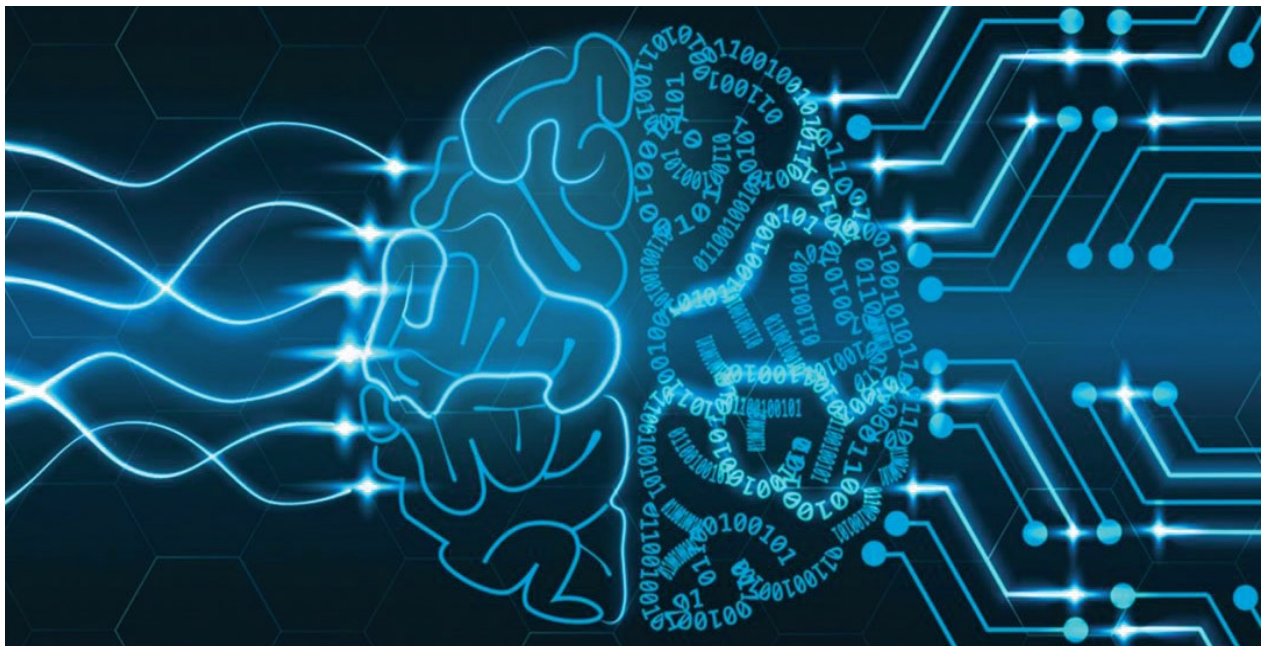
I f someone were to come up with an idea for an investment, they would try to test it with historical data or simulation. If this verification shows a promising return, they would implement the idea, likely as an automatic or a semi-automatic trading system, and then put real money into it. But the story does not end here. Because it is built on assumptions and heuristics, everyone knows any investment strategy will have an expiry date; we just never know it beforehand. Thus, the user of a trading algorithm will have to continuously

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> WHILE EXPLAINABLE AI IS A RESEARCH TOPIC, MACHINE LEARNING OR AI SOFTWARE COMPONENTS ARE BLACK BOX TECHNOLOGIES WITH DECISION RATIONALES BEING OPAQUE TO HUMANS.

monitor its performance. When it no longer meets the expectations, it will need some tune-ups, or may even face retirement.

The same should happen to machine learning components in a larger system.

While explainable AI is a research topic, quite surely the machine learning or AI software components in use today are 'black box' technologies with decision rationalesbeing opaque to humans. We know it works because we tested it (like we tested the investment strategy with historical data). However, we do not know why it works. One day, if some subtle thing changes and the machine fails to recognise it, the technology will stop being intelligent. The problem is that we do not know what this inalterable thing is because the machine never told us.

Therefore, while AI and machine learning are niche and cool building blocks for a software system, we should pay close attention and recognise that they are not the same as the other components. The formula for calculating compound interest will not change in the next thousand years, and therefore we can rely on it, as long as we are consistent in whether the interest rate is expressed as percentage points or fractions. A system to understand a press release or extract information from a company's annual report, however, may cease to work if the language evolves or some new legislation causes changes in parts of these documents. Just like how an investment strategy operates, we need to continuously monitor the performance of these black box technologies and tune them up occasionally.

This has changed the way we need to manage a software system in practice. Besides monitoring for cybersecurity and performing backup regularly, we should check whether the input and output match and make sense from time to time. Building a system is no longer once and for all. We need to keep in touch with those who understand how the system is built so that they can help fine-tune and re-train the machine learning components when needed. Moreover, whether there is a privacy concern in sampling the record of the input and output in order to determine if the algorithm is still relevant should be agreed upon by the engineers and stakeholders.

We should, thus, not be surprised if we need regular maintenance for AI systems, as this is necessary, and should plan for it accordingly when adopting such a solution.

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AI is great, **data is even better**

It is often believed that AI models, by default, can produce the desired results. But in reality, it is the quality of data that defines their success

Datasets are essential to AI models. They provide the truth by which we train AI models and measure their success. Engineers generally look to the AI model as the key to delivering highly accurate results, but it is often the data that determines the model's success. Data flows through every step of the AI workflow, from model training to deployment, and the way they are prepared can be the main driver of accuracy when designing robust AI models.

Engineers can use the following tips to improve their data preparation process and drive success when developing a complete AI system.

TIP 1: DON'T SETTLE FOR INADEQUATE DATA

If you don't have enough data for your AI model, don't settle for it. There are various techniques you can use to augment and cultivate new data and overcome any shortage of data.

One can generate new data through simulation of a physical model, a common scenario used in predictive maintenance applications. Consider, for example, the case of a hydraulic pump used in oil extraction. You often know what the critical failure causes are, such as a seal leak in the pump. They rarely happen and are destructive, making it very difficult to get actual failure data. With tools that allow to design and simulate physical systems, you can create a realistic model of the pump and use it to run simulations under various failure scenarios.

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IF MORE DATA DOESN'T RESULT IN HIGHER ACCURACY, CLEAN, CROP, LABEL AND TRANSFORM THE DATA TO PROVIDE AS MANY HIGH-QUALITY DATA SAMPLES TO THE MODEL AS POSSIBLE.

Synthetic data produced can then be used to train AI models, alleviating the issue of lack of data for AI and allowing engineers to continue focus on building accurate models.

TIP 2: MORE DATA DOESN'T [NECESSARILY] MEAN A MORE SUCCESSFUL MODEL

A common reason for frustration when designing AI models is that even with large amounts of data the performance of the model does not increase.

For any problem where more data does not translate to higher accuracy, the solution lies in cleaning, cropping, labelling, and transforming the data to provide as many high-quality data samples to the model as possible. You should look for tools that can help in creating clean data samples and provide automated video labelling and signal labelling capabilities.

TIP 3: APPLY YOUR DOMAIN EXPERTISE TO TRANSFORM YOUR DATA

Accurate models are never a surprise when they are made with thoughtful, well-prepared data. This is especially important to engineers and scientists using signal data. Raw signal data is rarely added directly to AI models, as signal data tends to be noisy and memory intensive. Instead, time-frequency techniques are incorporated to

transform the data to gather the most important features the models will learn.

TIP 4: USE DATA TO GAIN INSIGHT INTO YOUR MODEL

Using debugging techniques, engineers can ask the model why a certain category was predicted and what features the model is primarily focused on based on the category. Debugging techniques such as LIME provide insight into the model through data. Therefore, data is equally important to the debugging process – offering insight into both the model and the most important features, with the opportunity to use the debugging information for model improvement.

In summary, it is important to look for the right data and ensure that you clean the data to develop better models. The other critical aspect is the need to apply domain expertise to transform your data and use data debugging techniques to gain insight.

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Pingel is Product Marketing Manager, MathWorks

Reimagining Customer Conversations with an AI Chatbot
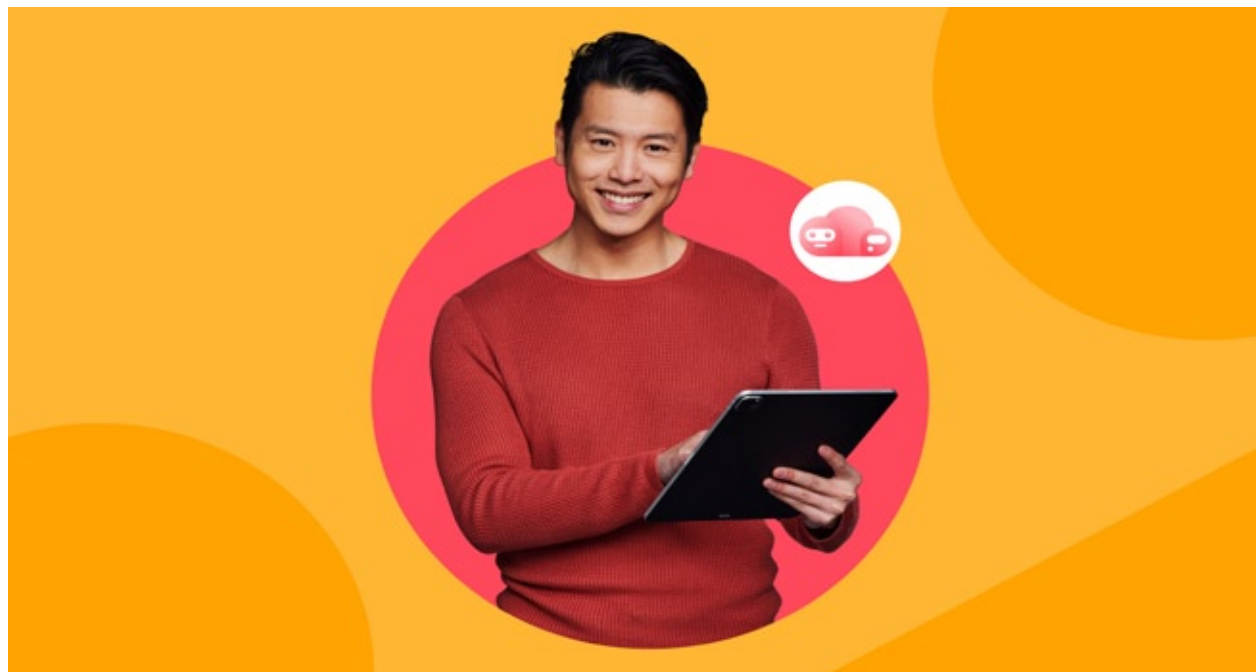
The new way of living contactless, an unexpected course pivoting remote-work models, and a massive surge in the call volume – The present pandemic situation has inundated people, businesses, and customer engagement teams in equal measure. With consumers spending so much more time online, the message is clear. Consumers need more help than they did in the past, and they want it quickly, in a more personalized way. Knowing where your customers are and creating a strong presence on those channels has become an important goal for any business.

As communication between companies and consumers occurs more frequently via messaging, companies today are looking for automated and intelligent tools to speed up their response time and reduce costs. Chatbots are, therefore, gaining momentum. AI powered chatbots will reach a new level of advanced functionality that can replace basic human-supported tasks. Automated responses leveraging business messaging asynchronously, via text or voice responses (IVR), will become a standard company offering.

Put together, how you engage with your customers and how well you know them amidst the emerging competition will be the key to thriving in the new normal. Welcoming the possibilities brought by AI-supported chatbot that enables you to deploy automated responses across multiple channels can be your best bet.

AN INTEGRATED EXPERIENCE ACROSS THE CUSTOMER JOURNEY

The pandemic underlined the long-term vision of CM.com that mobile technology will be the preferred way businesses and consumers around the world would want to communicate and interact with each other. They help clients offer an excellent customer experience to their consumers on their chosen channel, all based on the mobile-first rationale.

CM.com's Conversational AI Cloud provides a unique and intuitive drag and drop platform that enables organizations with no prior coding experience to create enterprise-grade chatbotswith ease. It supplements end-to-end customer care by offering a complete integrated cloud solution combining communication channels and SaaS featuressuch asintuitive, no/low code options to optimize Marketing and Customer Contact services.

By combining chatbots with these complementary tools, Conversational AI Cloud equips global enterprises with a unified view of the customer journey and customer data that delivers actionable insights. Once

you know who your customers are, you can proactively start a conversation. Then you begin to learn more about your customers preferences and intents to improve your business model.

CM.com positions itself as a strategic solutions partner for global enterprises that want to be ready for the future of conversational commerce. By combining rule-based and AI technologies, the company's Conversational AI Cloud provides high-value solutionsthat enrich user and employee experience.

CM.com's focus on practicality and performance is also evident in its conversational user interface (UI), designed with real conversations in mind to enable human-like experiences that execute commands and transactions efficiently. For example, when a customer visits a website and asks a question, regardless of the channel they use – WhatsApp, Facebook, e-mail to start a conversation with that company, the chatbot understands the conversational flow and decides to ask, for instance, two automatically generated questions. After the third question, a support agent will take over the conversation. During thebot-to-humanchat session, their chatbot uses AI to think about the specific issue and advise the support agent on which approach best facilitates the consumer. This type of cross-pollination between bots and humans is on the verge of becoming very refined. CM.com is uniquely positioned to offer precisely this type of hybrid service.

"Consumers have started gravitating toward brands that provide convenient, personalized, and hassle-free AI experiences. Making a difference through service is the most effective way to create value for our clients, and we work with them to deliver a five-star customer experience that has helped us "outperform expectations,"says Deepika Christina, Customer Experience Lead, CM.com India Hub," says Deepika Christina, Customer Experience Lead, CM.com India Hub.

Another key feature that distinguishes CM.com's platform is its end-to-end customer care solution. Most chatbot solutions only offer simple self-service and routing capabilities. Conversational AI Cloud, however, compliments multiple Customer Experience related abilities, including messaging, voice, payments, contract sign, user authentication, number verifier, and ticketing.
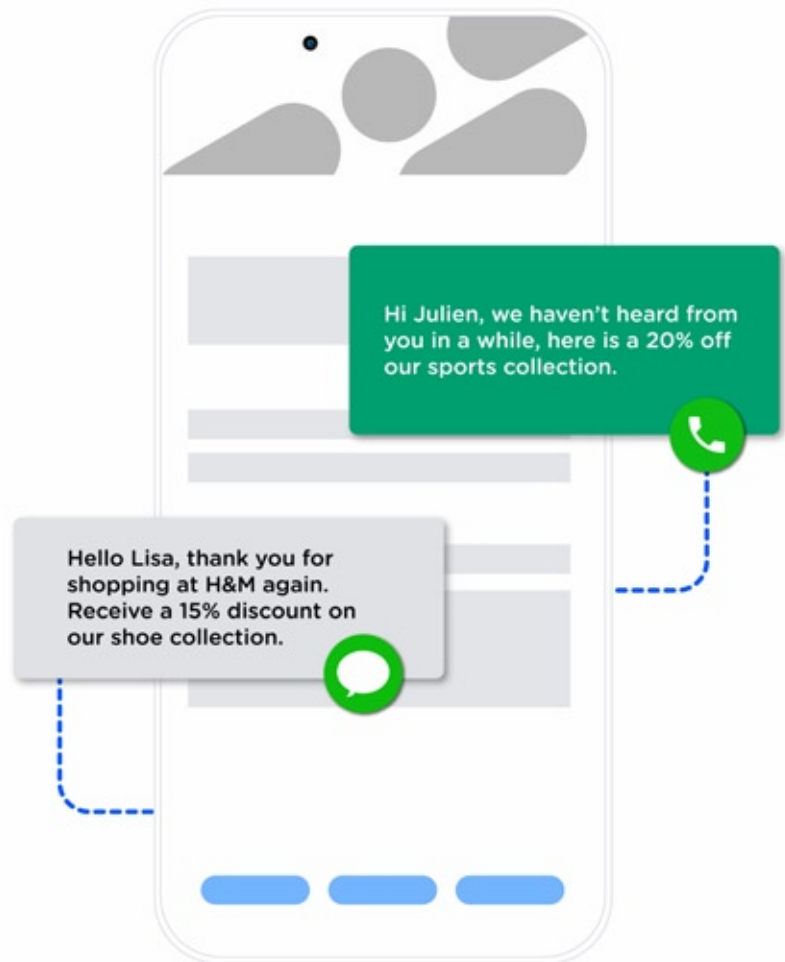
The company has consolidated several of its services which elevate customer care to the highest level by providing access to all messaging channels, tools, and features. Next to that, they offer an AI-enabled as well as ascripted chatbot that automatically integrates with their conversational channels, Mobile Service Cloud and Mobile Marketing Cloud. Their channel-agnostic services enable brands and businesses to communicate with their customersusing any means.

In addition, the exceptional conversational intelligence of the solution dramatically enlarges its applicability to ensure that the solution best suits the needs of the market. Today, CM.com's clients like Misguided, ANWB, Aegon, Eneco use chatbot services for optimizing diverse customer operations, including payments, customer services, sales, supply chain and inventory, notifications, and knowledge management across almost any digital channel and device.

With its strong overall performance, CM.com has earned Frost & Sullivan's 2021 Competitive Strategy Leadership Award.

Vinay K Mayer
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Blockchain in healthcare:
how ready is it?

With an efficient data recording system like blockchain, healthcare providers and consumers, on either end, stand to gain reliable data and greater connectivity

With the recent influx of attention on blockchain, many have been left wondering if the technology is ready to be implemented in any of the industries that need it the most. In the case of healthcare, the answer to that question is both positive and negative. Blockchain can be implemented in the healthcare industry, but there are a few things that first need to be worked out.

Right now, the healthcare industry has several pain points as well as a lot of potential. The question is whether blockchain technology and the healthcare industry are a match made in heaven. Let's look at both sides of the coin.

"

THE HEALTHCARE INDUSTRY HAS A LONG HISTORY OF BEING SLOW TO MAKE CHANGES; NEW TECHNOLOGIES AND BEST PRACTICES ARE OFTEN MET WITH RESISTANCE.

The healthcare industry is one of the prime beneficiaries of blockchain technology, which can be applied as a distributed ledger for health records. The technology is intended to reduce risks of fraud, ensure privacy of data, reduce administrative costs and improve data quality. The technology has applications in areas such as electronic health records, clinical trials, data sharing, identity management, and the pharmaceutical supply chain.

BLOCKCHAIN REVOLUTION

The healthcare industry has a long history of being slow to make changes due to the way it operates, and new technologies and best practices are often met with resistance. This is mainly due to the fact that the healthcare industry is largely dependent on technology that is outdated and the organisations themselves are slow to adopt change.

Additionally, the healthcare industry is highly regulated and there are a number of parties involved in one transaction. Blockchain is a decentralised ledger that allows multiple parties to work together without a third party to verify and validate transactions. This can help patients, providers, payers, and other healthcare organisations to work together to make healthcare more accessible and affordable, as well as streamline changes throughout the industry.

BLOCKCHAIN BENEFITS

Blockchain technology consists of data blocks containing hashes (digital fingerprints or unique identifiers), recent transactions, and previous blocks. In this design, each block is connected in sequence as each block has the data of the previous block. This technology of connected blocks is called blockchain.

It is not possible to change one of the blocks in the middle of the chain because all blocks behind the converted block will have to be rotated simultaneously. In this way, the data in blockchain network does not change. If the data in one block hash is mishandled or altered, it will make all subsequent block hashes invalid. This data is available for everyone to see.

Many aspects of blockchain technology, such as the consistency of data stored in blockchain, attract the attention of the healthcare industry.

With blockchain, medical records and insurance claims will be managed more efficiently and accurately. It will also accelerate clinical and biomedical research. All this is possible due to the many benefits of blockchain technology, including decentralised record management, immutable data audit trails, data provenance, robustness, and improved security and privacy.

To leverage blockchain in healthcare, medical information must be available for use by data subjects outside of hospitals. This is an important step in patient-

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> WITH BLOCKCHAIN, MEDICAL RECORDS AND INSURANCE CLAIMS WILL BE MANAGED MORE EFFICIENTLY AND ACCURATELY. IT WILL ALSO ACCELERATE CLINICAL AND BIOMEDICAL RESEARCH.

centred interaction that differs from conventional institution-driven interaction. Many challenges arise from patient-centred interactions, such as data standards, security, and privacy, in addition to technology-related issues, such as speed, incentives, and governance. Blockchain technology can facilitate the transition from institution-driven to patient-centred interaction and help address these challenges.

Blockchain allows patients to provide access to their medical data, for example, allowing certain researchers to access portions of their data for a limited period. Patients can also connect to other hospitals and collect their medical data automatically. With blockchain technology, patients can provide their full information to hospitals which is shared in a centralised database; when required, hospitals can directly extract information from that database regarding past diseases, allergies, past medications, and medical history. Such information is decentralised and immutable, which means no one can edit it and no one owns it. It is available for everyone to access provided they have an identifier.

This technology also provides a centralised database for the pharma companies and patients to assure them that the medicines they buy are original and not fake. This ensures that hospitals do not replace original medicines wit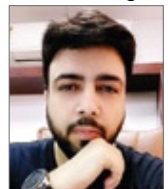h fake ones as the entire information about a product is available on blockchain and when it moves from one place to another, it is updated on the blocks. This prevents anyone from altering the expiry date, price, and ingredients on the label.

Earlier, hospitals may not have been willing to share information of patients on blocks to everyone who had an identifier without charging a fee. But with this technology, patients have the power to share their records easily. The information is updated and conclusive of patients' medical records. The general practice of hospitals to sell patients' data for research purposes is also prevented with this technology, as patients have the power to sell their data for a monetary reward.

HOW READY IS BLOCKCHAIN?

Blockchain technology brings to the table many healthcare opportunities that are beneficial for patients, researchers, and pharma companies; however, it is not yet fully developed for the healthcare industry. Several technical, organisational, and ethical challenges must be addressed before healthcare organisations consider adapting to blockchain technology.

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Make 'hardware and telecom' hay while the sun shines

Can India become the electronics and telecom manufacturing hub of the next decade? Yes, but only if it makes the right moves

The advent of the pandemic has been a consequential inflection point in the fundamental working of the social system. With the nationbeing under lockdown from time to time and over 55% people working from home, a lot more time is now spent at home leading to the increased demand for greater comfort and security through smart devices and appliances. While the markets of several sectors got disrupted during the pandemic, the consumer electronics and the telecom market turned out to be resilient, even with the intermittent closure of physical providers across the nation.

But there is a wedge in the Indian market scenario – despite being one of the largest consumer markets, India's share of global electronics manufacturing has been a mere 3.6%, even though domestic manufacturing grew at a CAGR of 23% over the last five years. This has been a consequence of snubbed opportunities in the last decade. When the trade wars began and companies were exiting China, many turned to ASEAN countries,

including Vietnam, Taiwan and Indonesia. However, India failed to attract such companies, again. The policies that were incorporated by these SouthAsian countries in the last decade are finally being introduced in India with an indigenous flavour.

Today, India has another opportunity and it is paramount to not miss it. Small calibrated steps would go a longer way than grand gestures. Digitisation in India at a mass level, with the lowest broadband rates in the world, could captivate MNCs and open up millions of manufacturing and services jobs. The PLI scheme launched by the governmentis one such step in this direction.

For the electronics and telecom market, the PLI schemes are designed to trigger an impulse for scale both for Indian companies and foreign companies who wish to manufacture in India at competitive costs. They are designed to have a domino effect creating pools of ancillary firms and services, and a wealth of jobs.

CALL FOR IN-HOUSE PRODUCTION

In the electronics manufacturing sector, it is astounding to know that India has virtually no display and semiconductor manufacturing units. Displays and semiconductors are the most expensive parts of phones and televisions and account for anywhere between 25% and 50% of the input cost. Moreover, the global supply chain infrastructure of semiconductors has suffered a significant crack which is driving up the prices; in fact, many estimates suggest that the major microchip buyers (auto and consumer electronics industry) are on the way to lose USD61 billion this year.

In India, domestic requirements are being met only through imports, and mostly from China and Taiwan. This is due to the repercussions of the elemental policies since the 1990s in India. The Indian industry still operates at the lower end of manufacturing and encourages the world to outsource only its non-core activities to India. This is the root cause of a birth of a non-innovative economy and substantiates the fact that India is still an innovation laggard in the global setting, coming at the 48th position behind China (14th) and Vietnam (42nd).

The big need now is to focus on indigenising the manufacture of parts, rather than just hosting the cheapest high-quality assembly lines. Building domestic manufacturing capability will lower import bills and cost of production and thereby drive demand further. Making these components in-house will also massively improve the country's net value addition to the overall electronics manufacturing process, which India aims to increase to 35-40% by 2025.

SLICE OF 5G PIE, AND MORE

On the telecom front, the next revolution in the tech industry is near and the entire globe is eyeing to be the early adopters of the 5G technology. India stands at the center of the 5G hub and can be considered a unique market for 5G equipment if we play our cards well. One of the factors that will favour us in becoming a 5G manufacturing powerhouse is the backlash against Chinese telecom gear makers. Nearly all the developed and underdeveloped nations are running away from Chinese manufacturers and barring them in their 5G development.

If India wants to become the 5G equipment hub, a fair bit of careful innovation would be required to elevate the manufacturing of next-generation radio access networks, internet of things (IoT) devices, customer premises equipment, routers and switches. Another interesting innovation where India could capitalise on is e-waste. India is the world's third largest e-waste generator, producing over 3.23 million metric tonnes of e-waste per year. This e-waste can be reengineered to make 5G equipment in a cost-effective manner.

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> ## THE BIG NEED NOW FOR INDIA IS TO FOCUS ON INDIGENISING THE MANUFACTURE OF PARTS, RATHER THAN JUST HOSTING THE CHEAPEST HIGH-QUALITY ASSEMBLY LINES.

Another pivot point can be to avoid the asked 26GHz band in the short term to prevent the pockets of telecom operators from getting burned. Instead, relying on existing airwaves and short Wi-Fi airwaves could be the game-changer for India.

There are immense challenges on account of numerous local hurdles, including inadequate infrastructure, the high cost of finance and logistics, and inverted custom duties. Even if India has the capability to manufacture printed circuit boards, other critical components such as diodes, chips and transistors are not made in the country. This will require building an end-to-end manufacturing system with efficient local supply chains to cater to the soaring demands.

The current PLI scheme for telecom caps R&D investment at only 15%, which will only help companies that don't plan on indigenous product development of telecom equipment, and will only lead to assembly. There is skewness towards contract manufacturers at the cost of companies who are investing top dollars in R&D to develop the products. A quick amendment is required to liberalise the local innovation infrastructure and unleash future sustainable growth. In addition, a push is needed on the annual gross expenditure on R&D from the current 0.65% of GDP to the global average of 1.5-3%.

Direct cash incentives through cheap credit and viability gap funding will be of foremost importance to set up new manufacturing units. Emulating China, India must also aspire to deliver an effective single-window clearance system for all approvals that should be provided in a time-bound manner. Ease of doing business cannot just exist on paper, but also in practice.

Rather than continuing to make products in fields where other countries already have the advantage of economies of scale, India must ride the future trends of increased consumer electronics and 5G components demand. Even though India does not have the first-mover advantage, the demand in India alone offers the opportunity for large-scale production, often a common problem in first world countries. The time is now to hit the burning iron.

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Let the **games begin!**

As Esports rapidly grows in emerging markets like India, and worldwide, a few IT hurdles need to be cleared before winning this market

Esports and online multi-player games have exploded in popularity in the last decade. This industry is growing particularly fast in emerging markets such as Southeast Asia, India, and Brazil, where internet user growth is much higher than Western countries. In North America, internet users have grown 125% from 2010 to 2020. In contrast, internet users in Asia have grown 305% during the same period. Tournament live streams are also creating massive audiences cheering for their favourite teams.

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ESPORTS VIEWERS MAY REACH 646 MILLION BY 2023, AND THE ESPORTS MARKET MAY GROW TO USD1.6 BILLION BY 2023, UP FROM USD950 MILLION IN 2020.

According to Newzoo, Esports viewers topped 495 million in 2020 and may reach 646 million by 2023. Furthermore, companies are pouring marketing funds into Esports through sponsorships and advertising. The global Esports market valued at USD950 million in 2020 may grow to USD1.6 billion by 2023. During the COVID-19 pandemic, companies are expediting the process to provide high-performance online games and high-quality virtual Esports tournaments across the world.

This massive expansion has created IT challenges that need to be addressed to continue supporting growth. One of them is that multi-player games such as Fortnite, Warzone, and Apex Legends frequently push for mandatory updates. Also, players are required to update their video game before they start playing, unlike smartphone or app updates. This is for several good reasons: sometimes game-breaking bugs are discovered and exploited to give players an unfair advantage. Additionally, new maps, characters, or seasons are introduced to the game with added storylines or weapons, thus forcing players to update before they start playing.

The problem is particularly with data-intensive games where updates can easily reach 100GB. Imagine you come home after a long day of work. And then look forward to a relaxing evening playing video games with your friends, only to discover that your system needs to perform an update that takes six hours to complete! All this creates a negative user experience. Slow updates are also undesirable from the perspective of game developers as they lock out all users when pushing an update. So, the number of players who can play after an update release is limited, which also dependson the download speed of the servers at the developer's end.

It is important to note that most online multi-player games are developed in the US and Asia but are played by users worldwide. Out of the current 10 most popular online games, eight are developed in California and are immensely popular in Asia. For example, the highest-ranked players, based on tournament earnings for League of Legends and StarCraft II are from South Korea. In fact, Esports is so popular in Asia that it will be a part of the multi-sport event of the 2022 Asian Games. As gamers seek fast download speeds to maintain instant access to their favourite platforms, developers cannot just focus on the domestic market. They need to widen their scope to reliably deliver content to emerging markets such as Southeast Asia, South America, the Middle East, and Africa.

Yet another challenge with global live tournaments is delivering content with extra low latency, far below the human cognitive level. Since Esports tournaments are

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WITH CLOUD NETWORKING, COMPANIES CAN MAKE INSTANT AND DEDICATED CONNECTIONS TO PUBLIC CLOUDS AND DATA CENTRES, TO REDUCE LATENCY DURING PEAK HOURS FOR GAMERS.

live games, all player actions must occur simultaneously. The initial solution was to host Esports live and have all players travel to this location, thus allowing developers to create a local network with the lowest possible 'ping'. However, the COVID-19 pandemic has disrupted this model since large gatherings are not allowed. As a result, online tournaments are being hosted. Moreover, demand will continue to grow beyond the pandemic since more casual players are signing up to play online tournaments. Thus, low latency is essential for the future of Esports.

TECHNOLOGIES TO OVERCOME CHALLENGES

Onthe infrastructure level, a globally distributed, full-mesh, and high-performing network backbone is critical. Even if you are on a public cloud already, you may want to consider a hybrid model to improve network performance and enhance the control of your infrastructure, especially in far-reaching markets such as China, India, Southeast Asia, and South America.

On the platform level, deploying edge cloud services can significantly improve the experience for gamers across borders. Enterprises can instantly enhance the digital experience for their users by creating a private network on demand.

Through cloud networking, companies can make instant and dedicated connections to public clouds and data centres. A reliable network can help reduce latency and jitters during peak hours for gamers. When they try to access content, intelligent routing can direct their request to the nearest server. Companies can also improve the experiences of gamers spread across the globe by using a Content Delivery Network (CDN) or Global Intelligent Accelerator (GIA) to distribute content from one point of origin to servers located near the users.

Another measure that game developers can take is optimising updates for areas with high demand, such as Southeast Asia and South America. This can enable all gamers to have their updates at roughly the same time. This technology also reduces the peak load on main servers, creating a more reliable update delivery network and minimising server downtime issues. Such benefits make edge cloud services like cloud networking, CDN, and GIA the most optimum solutions for Esports as well as online gaming companies with IT challenges that are looking to operate globally.

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Embedding success **in financial services**

Embedded finance is the next big thing in fintech, offering a multitude of benefits to institutionsin enhancing their products and services portfolio

Embedded finance has caused a sensation in the fintech market today. It is concerned with assisting banking institutions in enhancing their services and products through the use of cutting-edge financial technology. Embedded finance allows the end user, whether a person or a business, to access a desired financial service from inside their preferred app or platform. Its major benefit is that it simplifies financial procedures.

Before the advent of embedded finance, there used to be disconnect between a customer and a service provider or vendor. As a result, the customer frequently turned to

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EMBEDDED FINANCE IS HELPING THE GOVERNMENT REALISE AND SUPPORT ITS AMBITION OF PAPERLESS AND CASHLESS INDIA BY FILLING CREDIT AND INSURANCE SHORTAGES DIGITALLY.

a lender or a bank to close the difference. Embedded finance eliminates the requirement of a third-party bank or lender.

Sadly, the financial services industry did not update its core business model for many years, and the COVID-19 pandemic made the demand stronger than ever. Although banks and insurance companies have spent huge sums of money to digitise their existing processes, it is time that they fully invest in creating digital business models in response to the economic crisis. The embedded finance framework blends the power of advanced technology infrastructure with financial institution resources to deliver best-in-class capabilities to customers using digital platforms.

THE WHEELS ARE ALREADY SET IN MOTION
The COVID-19 pandemic has had a significant impact on existing banking models as well as consumer demand. For financial services, the technology to enable these needs is continuously changing and evolving. Non-financial firms have increased their efforts and refined their processes to provide consumers with products and services that address specific requirements. With the support of banking-as-a-service (BaaS), both fintech companies and non-financial institutions now have the opportunity to offer highly targeted interconnections.

Overall, embedded finance is making a difference in areas such as payments, lending, insurance and banking, and even improving governance and realising the Digital India dream.

Payments: Embedded payments make consumers' purchases quite pain-free. The customer with an app

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CUSTOMERS ARE TYPICALLY PREPARED TO SPEND EXTRA WHEN THEY ARE PROVIDED WITH A PROCEDURE THAT IS EASY TO UTILISE AND SAVES THEM TIME AND ENERGY.

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EMBEDDED FINANCE ALLOWS THE END USER, WHETHER A PERSON OR A BUSINESS, TO ACCESS A DESIRED FINANCIAL SERVICE FROM INSIDE THEIR PREFERRED APP OR PLATFORM.

having an in-built payment system simply presses a few buttons instead of having to reach into their wallet for money or credit card, and they are all set to go.

Lending: In the past, one had to apply for a loan from a bank or get a credit card for borrowing money. Now, integrated financing allows anybody to apply and get a loan immediately after purchase.

Insurance: Embedded insurance systems eliminate the need for an insurance agent or broker during the purchase of a policy.

Banking: Embedded banking is a marketplace that helps fintech companies incorporate banking and payment services into their software and user interfaces.

Government: Embedded finance is helping the government realise and support its ambition of a paperless and cashless India by filling credit and insurance shortages digitally.

CONSUMERS PREFER QUALITY OVER AFFORDABILITY

A quick look at the use cases and the approach by the sectors indicate that embedded finance leads to increased practicality and convenience for users. It provides for a more user-friendly interface enabling faster transactions. In fact, customers would want to continue using your goods if you have a user-friendly interface that improves the whole consumer experience. Integrating embedded financial services also allows organisations to explore new revenue sources. In addition, it helps improve customer stickiness and increases the conversion rate.

Customers are typically prepared to spend extra when they are provided with a procedure that is easy to utilise and saves them time and energy. Many clients place a higher value on usability and convenience than on financial expenses, making them more ready to accept financial risks. One may embrace embedded finance to benefit their organisation in a variety of ways, from payment processing to payroll, insurance services, and compliance management.

Needless to say, embedded finance plays an essential role in developing the future of financial services and, ultimately, has the ability to significantly alter the market in nearly every aspect. It allows many firms to move beyond their specialty products and become multi-market sales people or suppliers by offering an easy and convenient supporting role.

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JYOTHIRLATHA B
CTO, Godrej Housing Finance

" RAISING THE BAR TO UPGRADE TECH STEADILY IS THE NEW NORMAL

Having worked with leading private sector banks as well as a telecom player, she has anchored deep tech initiatives such as robotic process automation (RPA), artificial intelligence (AI), machine learning (ML), and natural language processing (NLP), and also reengineering of business processes for core banking, trade finance, corporate banking, payments and loan management products. She also has experience in setting up payments bank and delivering scalable infrastructure and cybersecurity posture. In an interview with Dataquest, **Jyothirlatha B***, CTO, Godrej Housing Finance (GHF), talks about the digital transformation initiatives of the company, the impact of COVID-19 and the role of technology in redefining the housing finance sector in India. Excerpts:*

The pandemic has led to new protocol and approach to service delivery. While the banking sector had for long moved to the less-contact service model, how has it impacted the lending process post COVID-19?

We are among the very few organisations that were launched during the pandemic. We have adopted a digital-first approach right from our inception. Our 'zero touch' processes enable end-to-end digital journey for our customers and include customer sourcing, documentation, research, risk analysis, and disbursement, all powered with automated and predictive technologies which source requisite details and enable data-driven eligibility checks, online authentication and verification of documents, video-based virtual discussions and finally onboarding.

In a digitally disruptive world, enhanced digital capability, especially in the lending business, offers a great deal of benefits for an organisation around customer experiences and better decision-making.

"

FINTECH HAS REVOLUTIONISED DIGITAL TRANSFORMATION FOR FINANCIAL INSTITUTIONS BY PROVIDING NICHE SOLUTIONS AND REDUCING OPERATIONAL AND RELATED CHALLENGES.

There has been a massive shift in customer expectation during the last one year and business models are evolving keeping the customer at the centre. What is GHF doing on this front?

At GHF, our business model is designed around agility and flexibility and customers are at the core of all our initiatives. Our customer-centric business strategy and related products provide a positive, hassle-free experience throughout the consumer cycle. Our products, processes, policies and culture are designed to provide better experience and build long-term relationship and trust. We also use customer feedback to constantly improve the processes and minimise customer efforts, while maximising value for them.

And how is technology redefining the housing finance sector, particularly in the aftermath of the pandemic?

The pandemic has accelerated digital adoption to a great extent across organisations and sectors. Technology has not only enhanced organisations' ability to handle COVID-19-related crisis more efficiently, but also driven organisations to focus more on providing seamless customer onboarding with minimum contact. Technology today, especially in the housing finance sector, is in the forefront as an enabler across functions.

Fintech has been a big game changer for the BFSI sector in recent years. Are you looking at partnering with other banks and fintech players to further GHF objectives?

Fintech in many ways has revolutionised digital transformation for financial institutions by providing niche solutions. It has also helped reduce operational hurdles and related challenges. We constantly endeavour to enhance our systems and processes with solutions for an optimum user experience. Our aim is to evaluate and incorporate many more solutions and our partners play a crucial role in our evolving and expanding digital infrastructure framework.

So, what are the technological differentiators for NBFCs amid this health crisis?

Financial institutions have moved to end-to-end digitalised service offerings. The ever-evolving customer expectations have resulted in specialised offerings across functions for seamless customer experiences. Raising the bar for tech upgradation at a steady pace is the new normal.

Organisations need to build strong API capabilities to enable embedded finance. Digital-first and virtual offices demand more automation and intelligent decision-making.

"

TODAY, ORGANISATIONS ARE ACCELERATING THEIR DIGITAL STRATEGY TO BUILD APPLICATIONS THAT CAN ENABLE ANYWHERE OPERATIONS WITH DIGITAL-FIRST APPROACH.

Efficient usage of AI, RPA and data platforms will be a strong enabler for efficiency and service delivery.

What are the new products or features in the pipeline for GHF?

With a drive to provide an optimum user experience to our customers, all of our product variants are designed around flexibility to suit their needs. With the customer-first approach at our core, our current focus is to develop hyper-personalised products by way of developing new and innovative technologies. We are also focusing on enhancing our data platforms and rule engines for a seamless customer experience.

How are you ensuring seamless customer integration in this virtual world?

Customers want effortless interactions with organisations and they are increasingly adopting digital channels. We have defined our IT architecture and design principles based on an overarching omnichannel strategy to support a seamless experience. With well-integrated customer portals, website and contact centre applications, we are able to engage with the customers virtually and providethem with a seamless experience when they research, buy or use a service.

And how is the COVID-19 situation impacting data analysis? Can AI and ML help in continuous evaluation of the underwriting and risk model?

Technologies like AI, NLP, and RPA are becoming a part of business technology processes providing meaningful insights for data-driven decision-making with improved operational efficiency. COVID-19 has disrupted consumer behaviours and changed economics. With the data trends varying during the pandemic, the internal legacy data may not be a good indicator for predictions. To make the forecasting engine work, organisationsneed to apply new modelling techniques and incorporate new data sources.

What are some of the key trends that will drive the sector during the rest of 2021?

Today, organisations are accelerating their digital strategy to build applications that can enable anywhere operations with digital-first approach. Cloud adoption is slowly increasing and companies are focusing more on process automations powered by AI/ML models to drive efficiency and agility. With the security perimeter getting redefined, privacy-enhancing features will also play an important role in enterprise architecture.

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Don't wait for the new normal, **rather build it!**

As we embrace more and more automation, we need the right boosters, the right awareness of risks and the right readiness for the complexity that comes along

Everyone is raving about automation and agility, but how do the details work? And would this roadmap change thanks to the pandemic? There is a slow lane and a fast lane – but are we shifting lanes now?

A recent Dataquest webinar on 'Autonomous Digital Enterprise (ADE)' unlocked some new routes. The panel saw experts from BMC Software put their heads together and translate the thrust that ADE brings in.

HELP FROM CRISIS?

While many countries are ahead of the curve in the network revolution, India is stepping on the curve. All the big technology forces around need a major shift in the enterprise mindset. But is that happening, argued Shubhendu Parth, Editor, Dataquest and Voice&Data.

Ram Chakravarti, CTO, BMC Software, explained that while strategic priorities vary from enterprise to enterprise, there is continuous focus on data analytics initiatives,

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COVID-19 HAS ACCELERATED RESILIENCE, AND EMPHASIS ON CONNECTIVITY. AUTOMATION CONTINUES TO MANIFEST AS A JUDICIOUS INFUSION OF AI IN SPECIFIC USE CASES.

— **Ram Chakravarti,** CTO, BMC Software

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SMEs NEED TO APPROACH THEIR DIGITAL TRANSFORMATION IN AN AGILE MANNER. DIGITALLY EMPOWERED SMEs HAVE TWICE THE REVENUE PROJECTIONS THAN OTHERS.

— **Sunil Thakur,** Country Director – India, BMC Software

renewed focus on customer experience, and also focus on de-risking one's overall cybersecurity risk. "The COVID-19 phase has accelerated resilience, and emphasis on connectivity. Automation continues to manifest as a judicious infusion of AI in specific use cases. Differentiation will require bold bets in data and analytics for high-value use cases as well as killer customer experiences with conversational AI and DIY customer service."

But the post-wave-to-recovery phase would be quite stark and might necessitate enterprises to carve a careful strategy. What would that be? Parth wondered.

Looking back at how we faced the earlier waves can help with some insights. "In the second wave, we were past the steep learning curve that was required earlier and there was lesser disruption. The return to work was much faster. But some supply chain disruptions had an impact on manufacturing operations. We learnt to work from anywhere. This was a big shift for both the employee and employer. Reluctance in adopting technology has changed into a mindset of investment in technology," pointed out Sunil Thakur, Country Director – India, BMC Software.

ADE helps here with roots in Industry 4.0. "The explosive

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> ## WHILE MANY COUNTRIES ARE AHEAD OF THE CURVE IN THE NETWORK REVOLUTION, INDIA IS STEPPING ON THE CURVE. THE BIG TECHNOLOGY FORCES NEED A MAJOR SHIFT IN MINDSET.
>
> — **Shubhendu Parth,** Editor, Dataquest and Voice&Data

growth of devices, data proliferation and rapidly changing customer preferences are upending how companies operate. We believe in the constancy of change imposed by technology. Black swan events such as the pandemic have created a perfect storm forcing companies to rethink their operational models. Evolving into ADE is akin to Industry 4.0 on steroids," Chakravarti explained.

INDIA'S OWN PATH

So what is stopping India, even now? Parth put the spotlight on some innate struggles.

Thakur rewound how Industry 4.0 was primarily aimed at rebuilding manufacturing and supply chain operations. "The primary incentive was cost optimisation. But it actually drove efficiencies. Now, this term is not just for manufacturing industries but for every industry. Cloud providers are making all latest technologies available to everyone. In India, automation for long has been viewed as a manpower-reduction enabler. But the pandemic has pushed enterprises to change their view on automation. Now enterprises want to talk a lot about automation."

As to the complexity and proliferation of IoT devices, there are many other spillovers of automation. Will it be a digital infrastructure nightmare? Parth reflected.

Chakravarti dismissed that possibility contending that currently many industries are following the central computing model – characterised by one or more hyperscalers, virtual private clouds, on-premise clouds, etc. "But in the next couple of years, edge computing will complement this model. We will need to solve for latency and security then. If we do not address those issues, we would be in a nightmare. We are working on edge computing platforms as a bridge between edge asset portfolio and BMC products known for their scale and resilience."

Then there is the long tail of SMEs that are critical for driving the growth in India market. Parth asked the experts about their role and relevance in the digital adoption mindset.

SPELLING OUT AGILITY

Thakur feels that SMEs need to approach their digital transformation in an agile manner. "This is where technology companies have to advise on the right points of entry, and the journey of digital transformation. They should address specific challenges. Digitally empowered SMEs have twice the revenue projections than others. So, SMEs should adopt automation in a strong way as an enabler for getting value out of data and technology.

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THE FUTURE OF WORK WHICH HAS BECOME AGILE, AUGMENTED, BORDERLESS AND RECONFIGURABLE IS DRIVING CLOUD ADOPTION. PLUS, THERE IS INTELLIGENCE EVERYWHERE WITH AI.

— **Deepak Bhatia,** Product Account Manager – DSOM, BMC Software

Irrespective of the size of an organisation, data is going to be the biggest asset and ally in the face of an adversity as well. A strong foundation of automation is necessary in this scenario."

Cloud technology was also discussed from an Indian perspective. Thakur described how much impetus the WFH trend would give to cloud adoption. "There is absolute requirement for effective communication and collaboration. When you have a requirement of this nature, it helps to move into cloud and scale quickly. There is going to be a significant interest in moving to cloud."

The possibility of hybrid multicloud as an operating model also came up during the session. "Hybrid cloud will allow enterprises to not have limitations or reliance on a single model or provider. In public cloud, resources are shared. In private cloud, costs are high but the control is high too. So hybrid would help companies strike a balance."

Deepak Bhatia, Product Account Manager – DSOM, BMC Software,explained how the company's Helix strategy fits in the new landscape. "In the past few years, the market has been continuously changing. In the last two to three years, India has demonstrated major cloud adoption. Public cloud spending has been considerably increasing in APAC. We are spotting drivers such as the platform economy, and rising customer expectations for more convenience, customisation and control. Also, the future of work which has become agile, augmented, borderless and reconfigurable is driving cloud adoption. Plus, there is intelligence everywhere as AI explodes and pervades."

He listed many CIO painpoints such as the cost to support and administer infrastructure, painful upgrades and outdated versions, poor service quality, lack of transparency into IT performance, difficulty in gaining support, and slow manual processes. "We always look at how our customer's customer feels and experiences a platform's impact. So how to take away all these problems and focus on speed, customer experience and agility? That's where SaaS gives benefits of reduced maintenance overheads and other costs. There are no infrastructure management worries and there is more time to focus on business priorities and delivering customer value. SaaS helps improve scalability, reduce costs, accelerate time to innovation, and enhance security and compliance while strengthening agility."

In these small and big ways, automation and digital renaissance will continue to take a solid shape across Indian enterprises. The word agility has been redefined in the last two years. It's time to see it set a new language.

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Your tech dose from now:
twice a day after meals

Pharma experts have given a prescription to gear up for the arrival of the new normal. The needle is moving towards digital twins, cloud, and AI in a big way
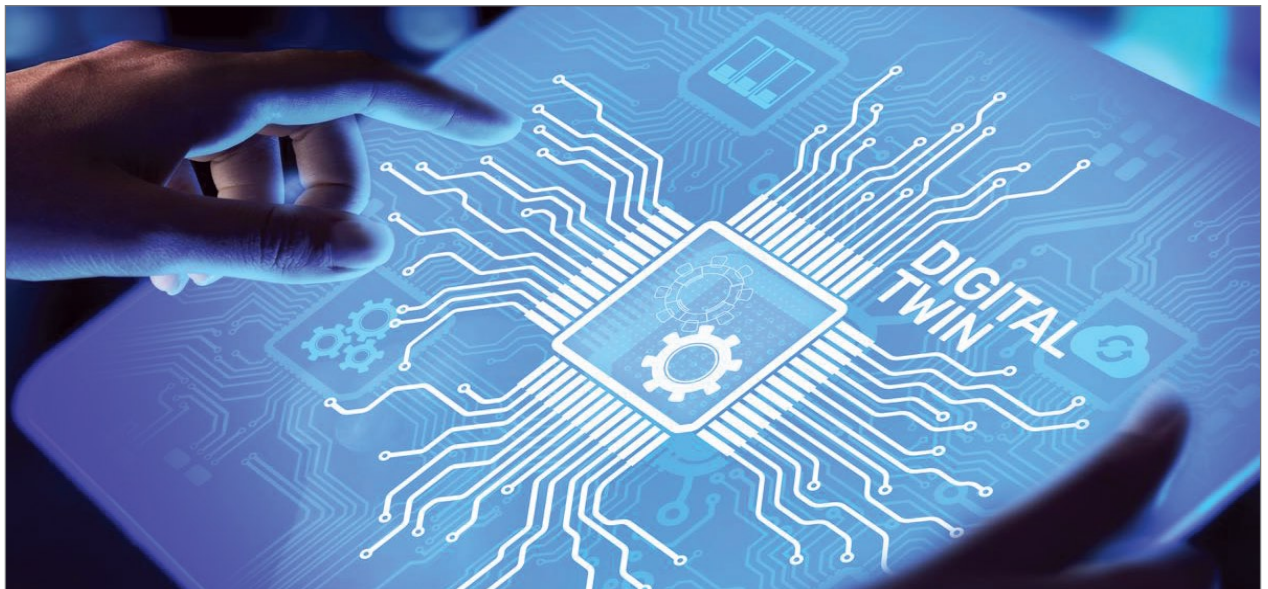
As per the Annual Technology Vision Trends Report, 83% organisations are accelerating transformation, 99% are ranking the pandemic as an unprecedented stress test, and 100% are innovating with a call to action. Laggards must really catch up or they will be left behind, unravelled Ankur Aggarwal, MD, Technology, Accenture India.

Speaking at the Dataquest webinar on 'Technology Vision for Life Sciences', Aggarwal stressed that it is a once-in-a-generation re-platforming opportunity. "The

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MODERNA DEVELOPED A VACCINE AT AN UNPRECEDENTED SPEED IN A DRUG DESIGN STUDIO POWERED BY CLOUD, AI, AND CONVOLUTIONAL NEURAL NETWORKS PAIRED WITH SCIENTISTS.

— **Ankur Aggarwal,** Managing Director - Technology, Accenture India

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RAPID DRUG DISCOVERY, OVERCOMING RAW MATERIAL SHORTAGE, VACCINE DEVELOPMENT EXPECTATIONS – HOW DID THE INDUSTRY PERFORM AND WHAT DID IT LEARN IN THE PRESSURE?

— **Anil Chopra,** VP, Research & Consulting, CMR

window to do so is very small. Leaders will leap forward over laggards."

Yes, pharma companies have been in the spotlight like never before in the last two years. But for them, the spotlight was on technology. The way in which and the place where they invest in technology are going through a visceral change.

There are some key trends that can help pharma companies shape their future. "Technology architecture is becoming critical to these organisations. The exponential growth and availability of technologies is igniting an era of business. Now, industry competition is actually a competition of technology stacks. We have seen how Moderna came up with a vaccine in a swift way. The team had a drug design studio powered by cloud, AI, and convolutional neural networks paired with scientists to operate at an unprecedented speed. To be agile and resilient, pharma companies need to

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THE RESPONSIVENESS OF A SUPPLY CHAIN GOT ACCENTUATED DURING COVID-19. SIMILARLY, CLINICAL TRIALS STARTED GETTING DONE IN A DISTRIBUTED AND HYBRID MODEL.

— **Atanu Roy,** Group CIO, Biocon

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COVID-19 VACCINE IS A BRILLIANT EXAMPLE OF HOW MANY COUNTRIES SUCCESSFULLY COMPLETED DEVELOPMENT AND TRIALS UNDER 12 MONTHS – A PROCESS OF 10-12 YEARS BEFORE.

— **Gyan Pandey,** Global and Group CIO, Aurobindo Pharma

fast-forward digital transformation with cloud at its core. That's why 77% pharma companies see business and technology strategies as inseparable now."

Almost 70% organisations expect their investment in intelligent digital twins to increase in the next three years. In fact, 40% are already using digital twins for innovation. About 87% find digital twins essential to their organisation's ability to collaborate in strategic ecosystem partnerships. Think of a 3D model of a patient, a virtual heart and what not.

Additionally, democratisation of technology is gaining fluency. There is a thrust on collaboration too. This is necessary as about 70% companies having faced moderate to complete supply chain disruptions during the pandemic.

Moderator Anil Chopra, VP, Research and Consulting, CMR, asked CIOs of leading pharma companies what their views and experiences are on these trends and tech imperatives. Rapid drug discovery, overcoming shortages of raw material, vaccine development expectations –

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WE ARE GENERATING EXPLOSIVE DATA TODAY. COMPANIES IN THE FINANCE AND CPG SECTORS ARE ALREADY USING DATA IN THE RIGHT WAY. IN PHARMA, THIS IS A LITTLE NEW.

— **Anjani Kumar,** CIO, Strides Pharma

there was so much pressure and expectation – how did the industry perform and what did it learn?

Atanu Roy, Group CIO, Biocon, explained the aspect of demand-supply flux. "How to extract more capacity during a drug demand was a challenge. That's where a significant role was played by analytics. The responsiveness of a supply chain got accentuated during the COVID-19 phase. Similarly, clinical trials that were done in a particular way earlier started getting done in a distributed and hybrid model."

The thought process towards technology for quality, efficiency, excellence and compliance is changing, seconded Gyan Pandey, Global and Group CIO, Aurobindo Pharma. "As to supply chains, in India, we depend heavily on imports. The whole API manufacturing took some internal evaluation. Apart from external customer engagement, the industry leveraged collaboration and remote infrastructure in a significant way. Cybersecurity due to opening of VPN, etc. for new applications in a remote landscape was a new challenge. So, doing clinical trials with speed and with a distributed model, with different compliance mandates, was also a challenge.

The adoption of many digital interfaces is still at a nascent stage. The COVID-19 vaccine is a brilliant example of how various countries have successfully completed a phase of development and trials in less than 12 months. It was a process of 10 to 12 years before. That's remarkable."

Anjani Kumar, CIO, Strides Pharma, echoed that change and specifically applauded the aspect of real-time data in this process. "Data never sleeps. We are generating explosive data in any organisation today. Companies in the finance and CPG sectors are already using data in the right way. In pharma, this is a little new. We are learning and exploring technology. How to generate data? What's the objective of this data? How to bring supply chain resilience? How to achieve anytime readiness? How to accelerate research and development? How to recruit the right patients for clinical trials? Now, analytics, AI and many other technologies are helping with precision in segmentation."

Technology is turning into something more than a haphazard transplant for this industry. It is becoming a core organ for enterprises. An organ that never sleeps – just like the data it breathes on.

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Let us transform the
government workplace

The government, being the largest service provider for citizens, needs to adapt to the work-from-home culture, just like the private sector

As private organisations around the world build strategies to adopt a remote working culture on a more permanent basis, the government sector cannot be left behind. In the wake of this trend, Dataquest along with Citrix hosted a webinar on 'Enabling Secure WFH Environment for Transforming the Government Workplace for New Normal'. Kicking off the panel discussion, Anil Chopra, VP, Research and Consulting at CyberMedia Research, said that the pandemic has been catastrophic. "We hope it gets over

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> TODAY, WE DON'T NEED TO BE PRESENT IN A FACTORY TO SWITCH ON A MACHINE. AT NIC, APP DEVELOPMENT HAPPENS AT A HUGE SCALE BY THE IT TEAM FROM HOME USING VPN.
>
> — **Rachna Srivastava,** Deputy Director General, NIC

soon and life gets back to normal. The government and PSU machineries should, however, always be on their toes. There are many citizen-centric services that need to be delivered but involve risks and challenges. This challenge can be addressed by perhaps enabling a work-from-anywhere culture."

"The pandemic has hindered a lot of functioning," seconded Rachna Srivastava, Deputy Director General, NIC, adding that everyone knows what the country has gone through. "We made government employees work on electronic files remotely. In any office, officials generally collaborate, discuss and make decisions, which are recorded on files. These files are automated by the Government of India departments."

UPSCALING VPN

Srivastava highlighted that the first challenge was to upscale the entire VPN infrastructure so that people can access the network from their homes. "As we were able to scale up the VPN, people could access files, allowing continuity of the government's business functions. Anyone working on a government file from home also needed the essential infrastructure at their home, including, at least,bandwidth in the beginning. Providing this bandwidth was a challenge during that period.

Moreover, there was a bigger limitation with regard to the usage of computers at home. We had a client-based device, and Windows updates clashed with the client side. People were not aware of how to take help while working from home. How to provide help was another challenge.

However, government employees from some sectors provided help. It is better to package a work-from-anywhere kind of a portal like that of NIC launched by our minister earlier this year. This portal was a natural progression. It includes departmental apps to see alerts, and helps in communication. With NIC's videoconferencing solution, youcan interact with team members with just a click. You can also define your own room and send messages toothers.

Today, we don't need to be present in a factory to switch on a machine. At NIC, app development happens at a huge scale. We allowed the IT taskforce, including testers and system admins, to continue the development of

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> THE EMOTIONAL ANGLE OF THE FIELD WORKERS IS STILL PLAYING OUT. PEOPLE ARE SCEPTICAL ABOUT DEALING WITH PHYSICAL FILES. THE FEAR OF THE VIRUS IS STILL THERE.
>
> — **Dr Yask Sharma,** CISO, Indian Oil

software from their home using the VPN. The onboarding of apps on the network also took place rapidly. You cannot be indifferent. And now, there is no other option. People have to be on the platform to be safe."

EMOTIONAL ANGLE

The session raised an important question on how to handle thechallenges of the new normal. Dr Yask Sharma, CISO, Indian Oil, said that collaboration is very important in this regard. He pointed that one of the challenges was of culture, besides the technical ones. "The security challenges were taken care of, and the bandwidth got upgraded. But the cultural challenges were different. In the manufacturing sector, people need to go to factories. Most of the organisations have a comprehensive, resilient plan. But nobody planned what will happen if people operating technologies, etc., in a plant do not show up. Once we started opening up, manufacturing companies required high manpower presence. Over a period of time, there has been acceptance of the new norms.

However, the emotional angle of the field workers is still playing out. People are sceptical about dealing with physical files. The fear of the virus is still there. The biggest challenge is the emotional makeup of people who are now returning to office. Everyone has been through an emotional rollercoaster in the past 15-16 months. Meanwhile, technology is helping meet some of these challenges. We now have tools that enable capturing of data, and are utilising technology solutions in a much better manner. The human emotional challenges will still take some time to be resolved."

RAILTEL SCALES UP

Talking about his learnings during the pandemic, CK Prasad, Regional GM and Head IT, RailTel,said they had to struggle to enable people to WFH initially. "We set up over 20,000 VPN accounts. There were also multiple apps. We opened up the network to all employees first, and then started putting in some controls. We have the RailNet, which is MPLS and on cloud. There was also a collaboration challenge. We scaled up cloud-

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AT RAILTEL, WE SET UP 20,000+ VPN ACCOUNTS AND SCALED UP CLOUD-BASED VIDEO CONFERENCING SERVICES. TOOLS WERE AVAILABLE EARLIER BUT ARE NOW BEING BETTER USED.

— **CK Prasad,** Regional GM and Head IT, RailTel

based videoconferencing services and integrated the conference room with cloud-based solutions. Cloud played an extremely important role. Tools were available earlier but are now being used in a better manner.

We have our own systems and power supplies, and run tier 3 data centres. As we needed some people on the ground, we identified some railway quarters and deployed some of the employees there. The L1 and L2 support teams could just walk down to work. Additionally, we are connecting with employees in Andaman and Nicobar Islands on VSAT. Coming to the emotional part, there are IT folks who have been working from home since last February. For them, it is really difficult to manage everything. People at the Joint Secretary level and above are working from office, while the staff below visits office on an alternate basis. The lunch timings are also staggered. The pandemic has made us resilient. Cloud has helped, as well as agility."

NEW WAYS OF WORKING
Vijay Jayaraman, Director, System Engineering, Citrix, said they have learned and adapted to new ways of working.

"Digital workspace is also evolving. Tools that were used over the last 15 months are the need for remote access. The system has always been there. But implementing that for nearly 50-80% of employees was never done before. Many organisations started seeing bottlenecks. Scaling up to 80-100% was at times a big challenge. Thus, investments in bandwidth and security gear ballooned. Many organisations adapted to that change. They looked at ways to provide employees access to apps that they specifically need. We are talking consensual access here. Some of the security tools' paradigm had to be redeveloped. Thus, providing central credentials, geolocation, type of device, etc. played a major role.

But can we provide all the access, data, and tools required? These were the conversations we were having with many organisations. Ease and productivity of digital workspace also came to the fore. It is the reality of the last 15 months."

MOBILE APPROACH
Srivastava talked about devices that have cropped up

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SECURITY CAN BE TREATED A CONSTRAINT, BUT THE BEST SECURITY WORKS BEHIND THE SCENES. MULTI-FACTOR AUTHENTICATION, ACCESS, VISIBILITY, ETC. ARE ALL IMPORTANT.

— **Vijay Jayaraman,** Director, System Engineering, Citrix

in the last couple of years. "Apps are being designed so that the experience is the same, irrespective of the device type. You develop once, and it executes to all. But certain apps, such as eOffice, can be challenging. The software is also being used across different government organisations and offices. There is also a manpower crunch. We decided right from the beginning that there will be a single code base for all users."

Srivastava further explained that the challenge with the single code base was to manage the various user levels. Different users want different functions. Sometimes, the app cannot be applied to the mobile format. eOffice is made for the tablet, so people can work on iPads. Some apps are old, and cannot be used like this. They have to be rewritten for mobile enablement. Now, the web app is being served by another layer. It is easy to onboard mobile apps on the same set of APIs.

"The mobile-first approach is now part of any kind of development work. We had a district government mobile app challenge wherein nearly 700 district AIOs participated. Over 300 mobile apps were published in

a month's time. The app development teams of NIC follow the mobile-first approach. The development work is done in one zone, catering to all types of formats. All apps are not like that, and converting them all to the mobile format is a huge challenge."

SECURITY TASKS

Explaining the issues surrounding security, Dr Sharma said that there are security concerns for a non-enterprise environment. Many organisations are still facing that challenge. Security has always been designed to protect from on-premise attacks. Solutions were available earlier as well, but probably not of the same level as today. A security professional will want complete visibility. In a typical on-premise environment, it is much easier. In the cloud, you can get a lot of insights as to what is happening. So, how do you check the visibility for everyone, and reach the end point?

"There has been some development in reaching end-point security in terms of visibility. We can now get extended insights. There is a demand that the end user

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> MANY CITIZEN-CENTRIC SERVICES NEED TO BE DELIVERED BY THE GOVERNMENT BUT INVOLVE RISKS AND CHALLENGES. THIS CAN BE ADDRESSED BY A WORK-FROM-ANYWHERE CULTURE.
>
> — **Anil Chopra,** VP, Research and Consulting, CyberMedia Research

should be able to connect from any device. We also have IIoT. The threat landscape has, therefore, expanded. Visibility has to be strengthened. Access and identity management will be critical. We also need to establish more trust. We have been talking about phishing attacks. How do we identify the right partners? Designing a robust security solution is, thus, very important." Dr Sharma, however, pointed out that the practicality of the solutions can be judged only over the coming days.

Jayaramanadded that there are many users accessing apps that run everywhere. "Security can be treated as a constraint, but the best security works behind the scenes. Multi-factor authentication is important. Providing access, based on context, is essential. Can I make decisions based on devices? It should also be easy for employees to access data and resources. Getting visibility, and decreasing the mean time to response are key. Automation becomes important here. Lastly, performance is crucial. AI can make life easier in all of these areas. Many organisations are trying to work in thisdirection."

BUILDING RESILIENCE

According to Prasad,resilience depends on the scale. "Cloud provides a lot of flexibility. We have a software-defined data centre, where we have brought in network function virtualisation. Today, every home has become a small office. But as attack surfaces have increased, we need to build resilience. Policies and best practices have to be applied consistently. We have deployed automation to a great extent. In one shot, we can upgrade 200-500 Linux and Windows machines. We are one of the largest users of eOffice. The government sector always has greater challenges."

He added that RailTel has also performed some geofencing since there were a number of attacks from China and Iran in 2020. "There have been several learnings in the past 15 months. We follow the 3-2-1 backup strategy, which means you have three copies of your data (production data and two backup copies) on two different media (disk and tape), with one copyat offsite for disaster recovery.Resilience is a continuous process and journey."

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